THE IRON TRADE REVIEW

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RAPID ORE SELLING

AT THE EARLIEST PERIOD IN HISTORY.

Not Much Complaint About High Prices.—Car Shortage Interferes With Many Industries.—Spot Iron Still Very Scarce.

Within a week after the general ore buying movement was started, practically all ore offered for sale was purchased. Including the manufacturers who do their own mining, there are now about 40,000,000 tons of ore under contract, and with the single exception of old range Bessemer, prices are higher than at any time in the history of the trade. In 1900, when prices were higher than at any time up to the present, the shipments were less than half of the tonnage estimated for 1907, and in the great year of prosperity, 1902, shipments were only 27,571,121 tons. It is expected that the production next year will be about equally divided between the steel corporation and other interests. The recent advance in prices, although considerably higher than conservative interests desired, has been received with little protest by furnace owners.

Pig Iron Activity. The pig iron market is perhaps less feverish than it has been for a few weeks, although the demand for spot iron is insistent, and from $25 to $27 is freely paid by foundries in urgent need of iron. In the south the principal transactions are for the second quarter for which the usual quotation is $18 Birmingham for No. 2 foundry. In the central west very little iron for first half delivery is now obtainable, and within a few days there has been considerable buying for second half delivery at from $21 to $22 for No. 2 foundry and malleable. Foreign iron is coming in slowly, is relieving the situation in the east, and is expected to have some influence in the central west at an early date. Heavy contracts for English and Scotch iron have been made and deliveries can be given in about six weeks, the usual price being $23.50 New York.

Railroad Delays. The car shortage is an increasingly heavy handicap to many industries. Delivery of southern iron is much delayed, and it is estimated that in the Pittsburg district and in the Mahoning and Shenango valleys there is a shortage of 100,000 cars. It is becoming more and more evident that there is also far less trackage than is necessary. This condition is likely to grow worse as the number of cars increases. Many manufacturers are complaining of more difficulty in getting coal than in obtaining pig iron. Delivery of crude steel and finished materials is also much delayed.

Prices Advancing. Finishing mills continue to work to their full capacity, although the demand for structural shapes is not so strong. The American Bridge Co. booked only about 5,000 tons during the past week, but no one is doubtful for the future. At the meeting of the sales managers of this company in Chicago, all reported an unprecedented amount of business in sight. The most important contract of the week taken by this company is for between 4,000 and 5,000 tons of bridge work placed by the Delaware, Lackawanna & Western railroad. Railroads, by increasing the wages of employes and dividends, are showing their confidence in the continuance of prosperity, and heavy buying is expected to continue. The tendency toward higher prices is being felt in finished lines, recent advances being $2 on hoops, $1 on wire and $1 on light rails. The bar iron market is very strong and the principal producer has advanced its quotation $1 a ton. Although iron bars now command $5 a ton more than steel bars, it is not expected that the price of the latter will be advanced by the principal producer. The demand for tubes is very active and higher prices are anticipated.

STEADILY IMPROVING

ARE CONDITIONS IN STRUCK FOUNDRIES

According to Reports to the National Founders' Association.—Alumni Meeting and First Session of the Convention.

(Special Telegram.)

New York, Nov. 13.—The information is freely circulated that O. P. Briggs will be strongly urged to accept another term as president of the National Founders' Association, with complete charge of its executive and administrative affairs.

The largest and most enthusiastic alumni dinner ever given by those who have served on the administrative council of the National Founders' Association was held Tuesday evening at the Hotel Astor following the two days' session of the present council. A. C. Pessano, by virtue of his having held the presidency during the preceding year, served as chairman. When all had gathered about the table, he asked that heads be bowed for a moment in silent meditation over the death during the past year of the one who, it is perhaps no exaggeration to say, was the alumni's most beloved member, Frederick T. Towne. At the close of the dinner the chairman reviewed the work of the association from its inception, giving due recognition to the many sacrifices of those who had guided its destinies from the beginning up to the present. He showed how it had been impossible to continue the policy of the association as it was at first inaugurated because of the difficulty of securing anything like equitable conditions from the molders' union. This had led, he explained, to the employment and instruction of a large number of non-union men who were today one of the association's most valuable assets and a source of inestimable strength.

President Briggs' Review.

President O. P. Briggs followed with a complete review of the association's work during the past year, setting forth its many difficulties and the phenomenal success attending the efforts of its members to conduct their

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THE WEEK IN IRON CENTERS.

PITTSBURG.

Advances in Finished Lines.—Scarcity of Cars.—Scrap Higher.

Office of THE IRON TRADE REVIEW, 521 PARK BUILDING, Nov. 14.

With the exception of one or two instances where there are strong indications that pig iron prices have gone almost crazy on account of the scarcity of this material for deliveries between this time and the middle of next year, there have been no unlooked for changes in conditions during the week under review. A few of the finished lines have taken their turn to advance and the market on wire products has been advanced $1 per ton, hoops $2 per ton and light rails $1 per ton since the last report. Scrap prices have advanced, but no business has been done at the increase, consumers having refused to pay the former prices. The coke market is very strong and shows still further tendencies to advance and iron bars are very strong, there being strong probabilities of an upward movement. There has been no change in the price of steel bars by the leading producers and plates and structural material remain the same as they have been since the first of the year. The sheet and tin plate business is quiet at the present time, although specifications against old contracts are very heavy and manufacturers have more business on their books than they have had for several years at any one time. The chief item of interest in this connection is the announcement of the LaBelle Iron Works, at Steubenville, O., to erect two new jobbing mills and eight sheet mills, with an annual capacity of about 52,000 tons per year, which will be completed within five or six months.

The car shortage in this district is getting more severe and it has been estimated that on the railroads operating in the Pittsburg territory and the Mahoning and Shenango valleys there is a shortage of 100,000 cars, with no immediate prospect of betterment. Cars sent out of this territory are not being returned and this is particularly true of those sent west of Chicago. Since 1903 the Pennsylvania railroad alone has expended $35,000,000 on freight car equipment and one of the leading traffic men in Pittsburg is authority for the statement that at the present time the system has not got on its own tracks as many cars as it had in 1903, due entirely to the non-return of cars sent over other roads and held in local trade or sent in other directions.

At one time within the past month 17,000 tons of steel billets were piled in the yard of one Pittsburg mill, on account of inability to secure cars in which to ship them and finishing mills have been seriously handicapped through not getting their supply and at the same time finished material is piled up almost to the roofs awaiting shipment.

Pig Iron.—With the exception of 750 tons of Bessemer pig iron sold at $23 for prompt shipment, the sales of Bessemer and basic have been almost nothing during the week. There are a few odd lots to be had, some of it in the hands of brokers, but the highest price yet asked since the scarcity developed came from a valley furnace when it quoted $27.50, valley, on 1,000 tons for delivery during the next four months. The leading producer of Bessemer and basic pig iron is quoting $21 to $22 on first half iron. For second quarter delivery 2,000 tons of northern No. 2 foundry iron was sold this week at $20.90 furnace, with a 60c freight and 1,000 tons was sold for the first four months of next year at $21, furnace.

Two thousand tons of gray forge iron sold at $19.80 furnace for first half delivery. For first half delivery we quote as follows:

Bessemer Valley	21.00 to 22.00
Bessemer, Pittsburg	21.85 to 22.85
No. 1 Foundry, Pittsburg	22.35 to 22.60
No. 2 Foundry, Pittsburg	21.85 to 22.10
Gray Forge, Pittsburg	20.60 to 21.85
Basic, Valley	21.00 to 22.00
Basic, Pittsburg	21.85 to 22.85

Ferro-Manganese. — On the good grades of imported ferro-manganese, 80 per cent, the market is quoted $80 to $82.50, Pittsburg for both prompt and future deliveries. On imported 50 per cent ferro-sililon, we quote $106 to $108 for all deliveries and on 12 per cent imported $35 and domestic $34.25, Pittsburg.

Steel.—The situation as far as semi-finished material is concerned has not changed one way or the other and there is still a scarcity with no immediate prospects of improvement in supply. Bessemer billets are quoted $28 to $29, Pittsburg, but this price is nominal and the leading producers have none to offer and have endeavored to cut down specifications to actual requirements of the consumers and eliminate speculative possibilities. Reports have been circulated that sheet bars have been offered at $29.50, Pittsburg, but this cannot be verified. Open-hearth billets are quoted nominally $29 to $30.

Skelp. — The inquiry for skelp on new business is light and there is but very little to be obtained. Iron skelp has advanced materially during the past month, in sympathy with the high prices of forge iron and muck bar, and there is but little good iron skelp in the market. We quote the following prices: Bessemer grooved, 1.70c to 1.75c; sheared 1.70c to 1.75c; basic, grooved, 1.75c to 1.80c; sheared, 1.70c to 1.75c; iron skelp, 2.15c to 2.25c.

Muck Bar.—While there have been but few transactions in muck bar, the nominal price has advanced on account of the advance in forge iron and on all pig metal muck bar we quote $34 to $35 and on part scrap bar $31 to $32.

Rails and Track Material. — The leading interest on Tuesday of this week advanced the price of light rails $1 per ton. The inquiry is much in excess of the ouput of light rail mills, which are filled to capacity for three months ahead. The inquiry on standard rails is much better than it has been for several weeks and during the week under review local mills have taken on 25,000 tons, of which 200 miles of 60 pound sections was from a southern road. We quote as follows:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $33; 20 to 45 pounds, $32; angle bars for standard sections, 1.50c; spikes, $2.50 to $2.75 for forward deliveries.

Merchant Bars.—The volume of new business in steel bars continues to come in and there has been no change in prices, the Carnegie Steel Co., and Jones & Laughlin Steel Co., still quoting 1.50c base Pittsburg, while other interests, most of them filled up for several months ahead are quoting 1.60 for future deliveries. Bar iron prices are very strong with a fair tonnage moving and specifications heavy. We quote:

Common iron bars 1.75c Pittsburg in carload lots, 1.80c in less than carloads; Bessemer steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under three inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000

pounds, 0.10c advance; less than 1,000 pounds, of a size, 0.30c advance.

Merchant Steel.—The demand for shafting and machinery steel, and spring and tire steel is in good volume with premiums being paid in many instances for prompt deliveries. We continue to quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch, 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base, half extra steel card.

Wire and Wire Nails. — Effective Nov. 10, the price of wire products advanced $1 per ton. The demand for wire products is extremely heavy and mills are practically filled for the contract period and will not accept business for delivery later than 60 days. There are no rods to be obtained from local mills, the entire supply being required for the demands of the finishing mills. We revise quotations as follows: Wire nails, jobbers' carload lots, $1.90; retailers' carload lots, $1.95; less than carloads, $2; painted barb wire, $2.05 for jobbers in carloads, retailers in carloads, $2.10, and less than carloads, $2.20, with 30c for galvanizing; plain wire, $1.75 to jobbers and $1.80 by carload.

Structural Material. — There has been a trifle better inquiry, but the new business being placed with mills at this time is small comparatively speaking. With this condition deliveries are very good on the full range of rollings. There has been no change in prices and we continue to quote:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Sheets.—Specifications against existing contracts are very heavy and deliveries are far behind. While there has been some new business at the advanced prices, it has not been heavy and it is expected to be light for the next month or six weeks. It will be well along toward the first of the year before the question of second quarter business will be taken up seriously, although a little has already been done. We continue to quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; Galvanized, Nos. 10-11, 2.55c; Nos. 12-14, 2.65c; Nos. 15-16, 2.75c; Nos. 17-21, 2.90c; Nos. 22-24, 3.05c; Nos. 25-26, 3.25c; No. 27, 3.45c; No. 28, 3.65c; No. 29, 3.90c; No. 30, 4.15c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½ inch corrugation and $3.15 per square No. 26 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c.

Plates.—The congestion and deliveries on plates are getting worse even than they have been and specifications are tremendous with urgent demands for shipment. While this is strictly true of local mills, it is understood eastern mills are in somewhat better shape. Steel car companies and lake ship yards are the most insistent on deliveries. We continue to quote:

Tank plate ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Light plate schedule. No. 10, 1.70c; Nos. 11-12, 1.75c; Nos. 13-14, 1.80c; Nos. 15-16, 1.90c. Extras on the regular plate schedule are as follows per 100 pounds: boiler and flange steel plates 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Tin Plate.—Demand for deliveries is strong and specifications are heavy, but as in the case of sheets, the going new business is light and this condition is expected to hold good until after Jan. 1, at least. What little new business is being taken is strictly at the advanced price. The shortage of semi-finished material is not as exasperating as it was a month ago, but a shortage still exists and it is noticeable in the production of tin plate. We quote:

Coke tin plates, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Hoops and Bands. — The expected advance in the price of hoops came last week, and it amounted to $2 per ton. The volume of business just preceding the advance was very heavy, and has continued since that time. Mills are filled up for a long time ahead and the market is strong. We quote as follows:

Hoops, in carload lots, 2c; in less than carload lots, 2.05c; bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Merchant Pipe.—There has been no change in this market and for deferred deliveries a large tonnage is being taken on by the mills in small orders, but deliveries are bad. October was a particularly heavy month. The recent advance in prices has not affected the demand. There are no large line pipe negotiations pending at this time. We quote the following official discounts for consumers, jobbers' discounts being 79 basing, base sizes and 5:

				Galv
⅛ to ¼ inch	69	53	65.5	49.5
⅜ inch	71	57	65 5	49.5
½ inch	73	61	68.5	57.5
¾ to 6 inches	77	67	73 5	63.5
7 to 12 inches	72	57	6)	54
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	62	50	58.5	46.5
½ to 4 inches	69	57	65.5	53.5
4½ to 8 inches	65	53	61.5	48 5
Double extra strong plain ends, ⅛ to 8 inches	53	47	53.5	42.5

Boiler Tubes.—The inquiry is good and specifications are coming in freely, all concessions have been withdrawn and the market is firm at the recent advance. Locomotive boiler tubes are in excellent demand and if anything this has improved. We quote.

Boiler tubes.	Steel	Iron
1 to 1¼ inches	59	45
1⅜ to 2¼ inches	62	45
2⅜ inches	64	50
2½ to 5 inches	70	57
6 to 13 inches	62	45

Less than carloads two points less.
2½ inches and smaller, over 18 feet, 10 per cent, net, extra.
2¼ inches and larger, over 22 feet, 10 per cent, net, extra.

Old Material.—The scrap situation has resolved itself into a waiting game and conditions make it practically a dealers' market. There has been a little buying in odd lots, but no large tonnages are moving, dealers asking high prices which the mills have refused to pay. Prices on melting scrap have advanced and we quote as follows: Heavy melting scrap, $17.50 to $18; rerolling rails, $20 to $21; bundled sheet scrap, $14.75 to $15.75; iron car axles, $29 to $30; old car wheels, $20.50 to $21; old iron rails, $24 to $25; No. 1 wrought scrap,

$20.50 to $21; low phosphorus scrap, $22 to $22.50; machine shop turnings, $13.25 to $13.50; axle turnings, $15 to $15.50; cast borings, $11.50 to $12; No. 1 cast scrap, $18.50 to $19.

Coke.—The coke market is very strong and there has been considerable buying, inquiries coming in freely from parties who it was thought had covered for their requirements some time ago. Considerable coke is being stored in anticipation of bad weather and slow railroad movements. We quote the standard grades of Connellsville furnace coke for spot shipment $3.25 to $3.35, ovens, and for the first six months of next year the same. For the whole of next year $3.10 to $3.25 is quoted. On 72-hour Connellsville foundry coke we quote $3.85 to $4 on contract and $4 for shipment during the remainder of the year.

CHICAGO.

Heavy Sales of Plates, Shapes and Bars.—Pig Iron Strong.

Office of THE IRON TRADE REVIEW, 1362 MONADNOCK BLOCK, NOV. 13.

Contracts for about 100,000 tons of plates, structural shapes and steel bars have been placed with mills this week. The bulk of this tonnage will go into local storage for resale at a later date. Western mills are now practically filled up on these products for the entire year of 1907 and are disinclined to add to their present obligations if guaranteed deliveries are demanded. Specifications have shown a noticeable increase since the first of the month, and again exceed the productive capacity of this district. The deferred tonnage is increasing, and it is certain that mills will carry over into 1907 a larger amount of business than originally anticipated.

The car shortage is steadily growing worse. The postponed advance of $2 a ton in hoops went into effect last Wednesday. The base price now is $2 Pittsburg. Wire products were also advanced $1 a ton last week, making nails $2.05 Pittsburg. Pig iron has moved up another notch, spot delivery of southern No. 2 commanding $26.90 Chicago. Northern No. 2 on track is offered at $26.50. Old material continues to strengthen. Cast scrap is in the greatest demand, No. 1 grade selling at $17.50 Chicago. Car wheels and railroad malleable have each advanced $2 a ton.

Pig Iron.—There is but one demand felt in the local market, that is for spot iron. For this there is an ever ready buyer, willing to pay anything in reason and to take everything in sight. The grade is not of particular consideration, nor does it much matter whether the metal is of Virginia, Alabama or northern make. Anything in the shape of pig iron looks good to a foundryman these days, especially if it is en route or on track, and the seller has only to name his terms to have it taken off his hands without any further questions. Prevailing quotations for spot shipment range from $22 to $23 Birmingham for southern No. 2 foundry, and from $26.50 to $27.50 for northern No. 2. Next to spot, the bulk of the buying has been for second quarter. Practically all quotations for the first quarter have been withdrawn, and it is only a few odd lots here and there and some little resale iron that can be picked up for this delivery. For these $21 Birmingham is asked for southern iron and $25.50 for northern iron. The quotations on second quarter are a little easier, ranging from $18.50 to $19 Birmingham in the case of southern iron, and $24.50 to $25 for northern No. 2.

Some malleable Bessemer inquiry has been felt for third and fourth quarters, and on one lot of 1,500 tons, $22.50 Chicago was made. A lower price, however, secured the order. The inquiry for this delivery is not spreading and furnaces are not anxious to develop such tonnage. The car shortage in the south grows in severity, and shipments northward are more irregular. A shutdown stares not a few western melters in the face unless relief can early be obtained. Foreign iron is not popular in this section and the offerings of Middlesborough low grade phosphorus iron at $28 Chicago find few buyers. High silicon irons continue in strong demand, but are very scarce.

Southern silveries, four per cent to six per cent, are quoted from $27.90 to $29.90, Chicago, and eight per cent to ten per cent, southern silvery or Jackson county, $30.90 to $33.90. The higher prices below are for the first quarter; the lower prices for the second quarter:

Lake Superior charcoal	$24.50 to 25.50
Northern Foundry No. 1	23.50 to 24.50
Northern Foundry No. 2	23.00 to 24.00
Northern Foundry No. 3	22.50 to 23.50
Northern Scotch Foundry	23.50 to 24.50
Ohio Strong Softeners No. 1	25.30 to 26.30
Ohio Strong Softeners No. 2	24.80 to 25.80
Southern Foundry No. 1	22.90 to 24.90
Southern Foundry No. 2	22.40 to 24.40
Southern Foundry No. 3	21.90 to 23.90
Southern Foundry No. 4	21.40 to 23.40
Southern No. 1 Soft	22.90 to 24.90
Southern No. 2 Soft	22.40 to 24.40
Southern Gray Forge	21.15 to 22.15
Southern Mottled	20.65 to 21.65
Southern Silveries (4 per cent to 6 per cent Silicon	27.40 to 29.90
Jackson Co. Silveries, 8 to 10 per cent Silicon	31.40 to 33.40
Malleable Bessemer	24.50 to 25.50

Billets.—Dullness is the main characteristic of the local market. Very little, if any, trading is done here for spot delivery, and, because of the high prices asked only desultory interest is shown in forward requirements. Crude steel of any description for spot delivery continues scarce, but except from those who practice the policy of purchasing from hand to mouth and who necessarily suffer for their short-sightedness in times of great pressure and scarcity, there is no complaint heard of deferred shipments. Prices remain without noticeable change, forging billets being held at $36 Chicago, and wire rods, $34 Pittsburg for Bessemer, and $35 for open-hearth.

Iron and Steel Bars.—The expected advance of $2 a ton in hoops went into effect Nov. 7, raising the price to $2 Pittsburg. No further warning was given the trade other than contained in the original announcement, and the step is as much of a surprise as was the last-hour postponement of the original decision. Trading in steel bars this week has been augmented by large tonnages from western distributing interests. Specifications are also increasing and mills are falling further behind in deliveries. Large sales of bar iron are also reported in eastern markets on the basis of 1.70c Pittsburg, one transaction being for 4,000 tons. This movement has strengthened the local market, and while desirable tonnages can doubtless be placed at 1.55c, the ruling price is 1.60c Pittsburg, or 1.75c Chicago. We quote carload lots, mill shipments, as follows:

Soft steel bars and bands, 1.66½c, half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.16½c base, full extras; old rail stock, 1.70c. We quote bar iron from stock, 2.20c, full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, 2.40c to 2.50c full extras. Other sizes not mentioned above, $2.00 per 100 pounds base plus half extras.

Sheets.—Demand for black and galvanized sheets continues good. Specifications are active, and early deliveries are hard to obtain. It is understood the leading interest is eight to ten weeks behind on galvanized and a little worse on black sheets. Prices are firmly maintained.

We quote as follows: Black sheets, Nos. 8, 9 and 10, 1.85c Pittsburg; No. 28 gauge, 2.60c Pittsburg. Galvanized sheets No. 28 gauge 3.65c Pittsburg. Freight to Chicago 16½c per 100

pounds. Jobbers' prices on less than carload lots from store are as follows: Black sheets, No. 10, 2.20c to 2.30c; No. 12, 2.25c to 2.35c; No. 14, 2.30c to 2.40c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.70c to 2.80c; Nos. 22-24, 2.75c to 2.85c; No. 26, 2.80c to 2.90c; No. 27, 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.25c to 3.35c; Nos. 22 and 24, 3.40c to 3.45c; No. 26, 3.60c to 3.70c; No. 27, 3.80c to 3.90c; No. 28, 4c to 4.10c; No. 30, 5.20c to 5.30c.

Plates.—Fifteen weeks is the best delivery that can be given on any specification for sheared plates by local mills. The demand for this product continues exceedingly good, the Illinois Steel Co. having practically its entire output for 1907 contracted for. This is true also of almost all the other Steel Corporation mills. Universal plates are somewhat easier because of less centralization in the production of that product and earlier deliveries can be given. The trading this week has included several round contracts from local distributing interests. We quote as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.60c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago is 16½c per hundred pounds.

Jobbers' prices for shipment from local stocks are as follows. Tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches up to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch, 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel. — Specifications against old contracts have shown an increase since the first of the month. New tonnage has also been heavily increased by large contracts from local jobbers. Prices are without change. We quote as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base; beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base.

Rails and Track Supplies.—The Northern Pacific has augmented its previous purchases for next year's delivery by placing a contract for 15,000 tons of standard sections. A Mississippi interurban road has also ordered 1,500 tons. Light rails are selling freely, the local producer having its output taken for the next six months. Track supplies are also active, the leading western producer having withdrawn from the market on spikes for 1907 deliveries. We quote as follows:

Bessemer rails, $28; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $32; 25-pound, $33; 20-pound, $34; 16-pound, $35; 12-pound, $36, and lighter sections down to 8-pound, $42.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.50c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.10c to 2.25c; for smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Merchant Steel.—Specifications are again creeping beyond production, and mills are falling further behind in deliveries. No new tonnage is being taken because of the impossibility of securing delivery within any reasonable period. Prices are firm but without change. We quote as follows:

Planished or smooth finished tire steel, 1.86½c; iron finish, up to 1½ x ½ inch, 1.81½c; iron finish, 1½ x 1½ inch and larger, 1.66½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.16½c, and 1⅛ inch and larger, 2.06½c; smooth finished machinery steel, 1.91½c; flat sleigh shoe, 1.71½c; concave and convex sleigh shoe, 1.96½c; cutter shoe, 2.35c; toe calk steel, 2.21½c; railway spring, 1.86½c; crucible tool steel, 6½c to 8c, and still higher prices are asked on special grades. Shafting, 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Cast Iron Pipe.—Inquiry from gas companies this week has been heavy. The largest contract was placed by the American Gas Co., of East St. Louis, for between 3,000 and 4,000 tons, and the largest contract pending is from the Laclede Gas Co., St. Louis, for 5,000 tons. The Great Northern railway is also figuring on 4,000 to 5,000 tons of culvert pipe. Prices are firmly maintained. We quote as follows: Four-inch water pipe, $36; six, eight, ten and 12-inch, $34.50; larger sizes, $34; gas pipe $1 a ton higher.

Merchant Pipe.—While some falling off in new tonnage is noted as a result of the unseasonable weather prevailing, specifications keep their merry pace and mills are operating to the limit of their capacity. Prices are firmly maintained, but without change. We quote Chicago discounts in car lots, as follows: ¾ to six-inch black steel pipe, 77.35; galvanized, 67.35. From store in small lots, Chicago jobbers quote 74½ to 75 per cent discount on the base sizes.

Boiler Tubes.—New tonnage continues to move forward in an active manner. Specifications are also brisk. Prices are without change. We quote as follows: 2¾ to five inches, steel, 68.35; iron, 55.35; seamless, 2¾ to 4½, 50.85. Less than carload lots from store, base sizes, are 60 off for steel; 47½ for iron, and 42½ for seamless tubes.

Wire Products.—An advance of $1 a ton was made last week by the American Steel & Wire Co. in nails, smooth wire, barbed wire and staples. A corresponding advance was also made in schedules on bright and coppered market wire, field fencing and other wire products. It is also expected that some time this week new schedules will be issued on wire cloth and poultry netting. The large interests are still handicapped by a car shortage and shipments are slow in consequence. We have revised our prices, and quote jobbers' prices as follows: Wire nails, $2.05; painted barbed wire, $2.20; galvanized barbed wire, $2.50; smooth annealed wire, $1.90; smooth galvanized wire, $2.20; polished staples, $2.20; galvanized staples, $2.45. Carload lots to retailers five cents higher; less than carload lots, 15 cents higher.

Coke.—There is no apparent change in the local market. The principal trade is confined to spot delivery requirements, for which good prices are easily obtained. Standard 72-hour Connellsville brands still command $4.00 ovens, and furnace coke, from $3 to $3.25 ovens. Solvay coke is quoted $6.65 Chicago.

Old Material.—The activity of cast scrap is the strongest feature of the local market. Everything offered is promptly snapped up, price being scarcely a factor if the material is of the right grade. Car wheels are also in good demand, and have advanced to $23. Railroad malleable has advanced $2 a ton, now being quoted at $18 Chicago. All the lists on the market last week have been absorbed;

nothing new is offered this week. We quote gross tons in the first paragraph as follows:

Old Steel Rails (4 feet and over)	$20.50 to 21 00
Old Steel Rails (less than 4 feet)	19 50 to 20 00
Old Car Wheels	23.00 to 23.50
Old Iron Rails	28.00 to 28.50
Relaying Rails, subject to inspection	29.00 to 30.00
Frogs, Switches and Guards	18.50 to 19.00
Heavy Melting Steel	17.50 to 18.00
Mixed Country Steel	15.00 to 15.50

We quote net tons, as follows:

No. 1 R. R. Wrought	$18.00 to 18.50
No. 2 R. R. Wrought	17.00 to 17 50
Shafting	19.00 to 19.50
Dealers' Forge No. 1	13.50 to 14.00
Wrought Pipe and Flues	12.75 to 13.20
No. 1 Cast, 150 pounds and less	17.50 to 18.00
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	13.50 to 14.00
Country Sheet	9.00 to 9.50
No. 1 Boilers Cut	12.50 to 13.00
Boiler Punchings	16.00 to 16.50
Iron Car Axles	26 50 to 27 00
Steel Car Axles	23 00 to 23 50
Iron Axle Turnings	11.00 to 11.50
Cast Borings	9.00 to 9.50
Mixed Borings, etc.	9 00 to 9 50
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	18.00 to 18.50
Agricultural Malleable	17.00 to 17.50
Stove Plate and Light Cast Scrap	14 00 to 14.50
Old Iron Splice Bars	22.00 to 22.50

CLEVELAND.

Practically All Ore Sold.—Buying of Pig Iron For Second Half of 1907.

Office of THE IRON TRADE REVIEW. }
BROWNING BUILDING, Nov. 14 }

Iron Ore.—The general ore buying movement was started Nov. 5, and within a week practically all the ore was sold, Cleveland interests disposing of about 6,000,000 tons. There is still some non-Bessemer ore to be had, but the amount is limited. Practically all ore available is silicious. Buyers have placed their orders freely with very little complaint about the advance in prices. A few of them have stated that they are not buying up to their full requirements, but sellers believe that if this is true, they will have great difficulty in meeting their requirements at a later date. It is authoritatively stated that the Steel Corporation has not yet made an estimate of its probable shipments, but they may be roughly placed at 20,000,000 tons, while those of the independent interests will be about an equal amount. The total shipments for 1907 will therefore be in the neighborhood of 40,000,000 tons. The sales made in Cleveland, above referred to, do not include any of the producing-consuming interests. Basing prices on the new guarantee of iron content, we quote as follows:

Old Range Bessemer	$5.15
Mesabi Bessemer	4.90
Old Range non-Bessemer	4.30
Mesabi non-Bessemer	4.10

Pig Iron.—There has been a brisk demand for spot iron and buyers are finding great difficulty in placing their orders. For prompt shipment $25 is freely paid for No. 2 foundry, and even higher prices could be obtained, if favorite brands were available. The feature of the week has been the marked increase in sales for the second half of 1907. One interest has sold from 15,000 to 20,000 tons for that delivery, and sales of another company include 6,000 tons of malleable. For fourth quarter delivery prices are from 50 cents to $1 lower than for third quarter, but the usual quotation for second half is $21 at the furnace for No. 2 foundry and malleable Bessemer. Some sellers are asking $22. Furnaces are not, as a rule, disposed to encourage buying for the second half. We quote f. o. b. Cleveland as follows for first half delivery, although undoubtedly higher prices are being paid in some cases:

Bessemer	$21.85 to 22 85
No. 1 Foundry	22.00 to 22 50
No. 2 Foundry	21.50 to 22.00
No. 3 Foundry	21.00 to 21.50
No. 2 Southern	22 00 to 22.50
Gray Forge	20.00 to 21.00
Gray Forge, Southern	18 00 to 18 50
Lake Superior charcoal	24.00 to 25.00

Coke.—The market is firm with foundry coke selling at $4 and furnace at $3 to $3.25.

Finished Materials.—The principal seller of bar iron has advanced its quotation to 1.75c Pittsburg, which would be equivalent to 1.845c Cleveland. Local mills have not, however, advanced their quotations, but they are unable to give anything like prompt delivery. Jobbers are selling bar iron at 2.00c and steel bars at 1.80c out of stock. In spite of the wide spread between iron and steel bars, it is not expected that the principal producer of steel bars will advance its quotation. Jobbers report exceedingly heavy business in all lines, especially in boiler tubes and pipe, and it is expected that an advance in quotations on boiler tubes will soon be announced.

Old Materials.—Scrap is advancing rapidly in sympathy with the pig iron market. This is especially true of machine cast, for which as high as $20 has been paid, although the usual quotation is from $18.50 to $19. Nearly all kinds of scrap iron have advanced during the week. We quote Cleveland delivery, gross tons in the first paragraph, as follows.

Old iron rails	$27.00 to 27.50
Old steel rails (over 6 feet)	20.00 to 20.50
Old steel rails (under 6 feet)	19.00 to 20 00
Old car wheels	19.50 to 20 00
Steel boiler plate	15.50 to 16 00
Steel axles	22 00 to 23 00
Malleable iron (railroad)	18.00 to 18.50
Malleable iron (agricultural)	15.00 to 15.50
Heavy steel	17.25 to 17.75
Country mixed steel	14.50 to 15.00

We quote net tons as follows:

No. 1 R. R. wrought	$18 00 to 18.50
No. 1 busheling	15.25 to 15.75
No. 1 machine cast	18.50 to 19 00
Iron axles	26.00 to 27.00
Axle turnings	12 00 to 12.50
Wrought turnings (free from cast)	11.50 to 12.00
Grate bars	14.00 to 14.50
Pipes and flues	14.50 to 15.00
Tank iron	12.00 to 12 50
Hoop and band iron	9.00 to 9.50
Sheet iron	9.00 to 9.50
Wrought drillings	11 00 to 12.00
Stove plate	13.50 to 14 00
Cast borings	9 00 to 9.50

CINCINNATI.

Market Quiet and Buyers Show a Disposition to Wait.

November 12

Pig Iron.—The market remains in practically the same position as to prices as a week ago. Southern iron for delivery this year is quoted at $22.00 to $23.00 Birmingham for No. 2 foundry. For the first quarter quotations range from $20.00 to $22.00 Birmingham, and for the second quarter from $17.50 to $18.50 Birmingham.

Northern iron for spot delivery is now $25.00 at furnace for No. 2 foundry, with first quarter delivery at $23.00 to $23.50 and second quarter at $21.00 to $22.00 at furnace. This applies to the southern Ohio furnaces.

The demand is less urgent now than a week ago and there are signs of buyers holding off. Prices have reached a point where there is hesitation to place contracts for forward delivery. Business in second quarter delivery pig iron is quiet. The feeling is developing that the market is near the crest of the wave. One buyer has stated that although he has not covered his wants for first quarter he will not buy now, as there is more room below present prices than above and he will take his chance on the offerings after January 1. This is a sample of some of the expressions that are being made by the buying end of the situation. Importations of pig iron are also being pointed out as an element of relief to the consumers and some makers of castings report users of heavy castings resisting the advances that must be made to conform to the high prices of pig iron. These are causes contributing to the falling off in the volume of inquiry and the lessening of general interest in the market on the part of the buyers.

Deliveries on contracts are slow, as there is a shortage of cars and consumers are urging shipments forward. But few producers of pig iron are able to keep up on their shipments, more especially in the south.

While the feeling is that the market is near the top, there is nothing in sight in the minds of the trade to cause apprehension of any important decline in the near future. Furnaces are so well provided with contracts that they can be complacent under any holding off on the part of buyers, and are generally believed to be in as strong a position as they ever were to maintain prices. The market has reached a resting state therefore this week, and developments must

be awaited. Quotations for first quarter delivery are as follows, f. o. b. Cincinnati:

Southern Foundry No. 1	$23.50 to 24.00
Southern Foundry No. 2	23.00 to 23.50
Southern Foundry No. 3	22.50 to 23.00
Southern Foundry No. 4	22.00 to 22.50
Southern Foundry No. 1, soft	23.50 to 24.00
Southern Foundry No. 2, soft	23.00 to 23.50
Gray Forge	21.50 to 22.00
Northern Foundry No. 1	24.65 to 25.65
Northern Foundry No. 2	24.15 to 25.15
Northern Foundry No. 3	23.65 to 24.65
Jackson County Silvery, 8 per cent	27.15
Southern Charcoal	26.00 to 27.00

Finished Material.—The demand in a jobbing way continues active and prices are well maintained. There is no quotable change in prices. We quote:

Bars at 1.83c, half extras, with dealers quoting 1.95c, for iron and steel out of store. Galvanized sheets No. 10 and No. 12, in car lots are 2.68c. We quote black sheets, No. 27 at 2.53c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.70c; No. 16, 2.25c; No. 14, 2.20c; No. 12 2.15c. Tank plates are firm and sell out of store at 2c to 2.10c for ¼-inch and 2.10c for 3-16 Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

Coke.—The market continues strong and in the Connellsville district the outside quotation is the most quoted. Cars are scarce and deliveries slow. Prices in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$3.25 to 3.50 per ton
Wise County, Va. Foundry Coke on contracts	4.00 to 4.25 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke on contracts	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.00 to 3.25 per ton
Connellsville Foundry Coke on contracts	4.00 to 4.25 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market is firm and prices for some grades are higher. We quote:

Old No. 1 railroad wrought, net tons	$17.50 to 18.00
Cast machine and foundry, net tons	16.50 to 17.00
Old iron rails, gross tons	25.00 to 26.00
Old steel rails, gross tons	18.50 to 19.00
Old short lengths, gross tons	17.50 to 18.00
Old iron axles, net tons	24.00 to 25.00
Heavy melting scrap, gross ton	19.50 to 20.00
Stove plate, net tons	12.50 to 13.00
Wrought turnings, net tons	10.00 to 10.50
Cast borings, net tons	8.00 to 8.50
Car wheels, gross tons	19.00 to 19.50

PHILADELPHIA.

Heavy Importations of Pig Iron. — Demand is Active.

November 13.

Pig Iron.—With iron at $25 a ton for 1906 delivery, not to mention $1 or $2 more for spot shipments, where it is possible to obtain such a rarity—the market continues to rise, and all conjectures as to where it will stop are a waste of time. Prices are remarkably strong, and as cold weather comes on, with its natural accompaniments of delays in transportation, and increasing difficulties in securing ore and coke, the prospects of still higher quotations seem only reasonable. In this immediate territory the situation is somewhat mitigated by the arrival of English iron, the first cargo of which reached port by the steamship Black Prince last week. Four or five other cargoes are now on the water, and it is reasonable to expect that within the next fortnight from 30,000 to 40,000 tons of Middlesboro and Scotch iron will have passed to consumers. Orders for foreign iron are steadily increasing and one large interest alone has arranged to bring in over 100,000 tons, not to speak of large contracts placed by Pittsburg and other consuming centers. This will help a little, of course, but in view of the rise in prices in England, the supply that can be brought from there is necessarily limited. Furnace men are acutely interested in the problems of getting sufficient ore and coke this winter, and also in the scarcity of labor. In view of the rise in the prices of all these commodities they expect no serious reduction in the prices of pig iron for many months. In the orders now being placed by consumers practically no distinction in prices is made between the first and second quarters of 1907. Very little iron has as yet been sold beyond July, but the buying movement is expected to begin soon. Prices, with some advances over last week, may be quoted as follows:

No. 1X Foundry	$24.25 to 25.00
No. 2X Foundry	23.25 to 24.00
No. 2 Plain	22.75 to 23.25
Standard Gray Forge	20.50 to 21.00
Basic	21.00 to 22.00
Low Phosphorus	26.50 to 27.00

New Material. — The advancing prices of pig iron are having their natural effect in stiffening the prices of finished material, and the market shows growing strength. Several mills have withdrawn entirely from new business for the first half of 1907, having already far oversold their capacity. The demand for structural material, plates and bar iron shows no diminution. The Reading Iron Co., one of the largest plants in this territory, has adjusted its troubles with its men by granting them a substantial increase in wages, and all departments are again in full operation. Prices, which are tending upwards, may be quoted as follows:

Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.83½c to 1.90c, steel bars, 1.78½c to 1.83½c; plates, 1.73½c to 1.83½c.

Old Material.—There has been no essential change in the scrap market during the past week. Prices rule strong, and in view of the close approach of winter, when supplies are necessarily diminished, and the high prices of pig iron, are expected to make another advance before long. For the present they may be quoted as follows:

Old steel rails	$18.50 to 19.00
No. 1 steel scrap	18.25 to 18.75
Old steel axles	22.50 to 23.00
Old iron axles	31.00 to 32.00
Old iron rails	26.00 to 26.50
Old car wheels	21.00 to 21.50
Choice scrap, R. R. No. 1 wrought	21.50 to 22.00
No. 1 yard scrap	20.00 to 20.50
Machinery scrap	19.00 to 19.50
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	16.00 to 16.50
No. 1 forge fire scrap	16.00 to 16.50
No. 2 forge fire scrap, ordinary	12.00 to 12.50
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	15.25 to 16.00
Cast borings	11.00 to 11.50
Stove plates	14.75 to 15.25

NEW YORK.

Pig Iron Again Higher.—Car Famine Handicaps Domestic Furnaces.

Office of THE IRON TRADE REVIEW. }
ROOM 1315, No. 150 NASSAU ST., NOV. 12. }

Pig Iron.—Prices are again higher and difficulties of delivery are increasing rather than diminishing. In the foundry field the situation is becoming more and more serious and no relief is in sight for weeks to come. A surprisingly large proportion of the iron which will be required by the foundries during the early months of the winter has not yet been provided for, and the domestic supply approaches exhaustion. It is still possible to secure foreign iron in almost any quantity, but the price for foundry is high—the best figures today are $23.50, delivered in New York—and the shortest time in which it can be laid upon the docks is six weeks. Free buying of Scotch and Middlesborough iron shipped some time ago has tended to relieve the local stringency, but melters are scurrying for metal. The situation in Newark, N. J., is probably no worse than elsewhere and there big melters are borrowing and begging iron from friends and competitors by the truck load.

Sales of foundry iron for prompt shipment have been in small lots largely of Middlesborough and Scotch iron. A few lots of domestic product have also found buyers at from $25 up. The price which prevails today pretty generally throughout the east is $27 delivered. There was one sale of No. 2 Pennsylvania, 300 tons, which brought $25 at the furnace. Cargoes of foreign metal, about 4,000 tons in New York and 8,000 tons, Boston, have been disposed of for $23 and $23.50. There has been considerable business in second quarter metal, and inquiries for the second half are becoming common.

The Sloss-Sheffield company sold several thousand tons of second quarter iron in a very few days at $18.50, Birmingham, and has now advanced the price to $19. Among the lots to be delivered in this district are one of 2,100 tons and another of 350 tons.

In pig iron other than foundry grades business has not been of large volume. Basic and gray forge have not yet reached prices so high relatively as foundry, and dealers are content to wait for the advance which they are confident will come. Eastern consumers of basic are all fairly well covered for the first half of the year, but there will be additional sales in the near future. During the last three weeks some 20,000 tons have been sold at $22 and $22.50 per ton.

The coke market is taking on the chief features of the foundry iron situation. The scarcity is not so severe, but prices are steadily climbing, foundry coke being held today at $4 and $4.25 and in some cases even $4.50

The following are prices of pig iron at tidewater for delivery during the first half of 1907.

Northern No. 1 Foundry	$23.50 to 25.00
No. 2 Foundry	22.75 to 24.00
No. 2 Plain	23.00 to 24.00
No. 1 Southern Foundry	22.00 to 23.00
No. 2 Southern Foundry	21.50 to 22.50
No. 3 Southern Foundry	21.00 to 22.00
No. 4 Foundry	20.00 to 21.00

Ferro-manganese has, during the past week shown the effects of the great activity in other materials of the trade. Spot would at present bring any price between $80 and $90 and future is held at $77.50

Certificates and Standard Contracts.—The week has witnessed no great activity on the N. Y. Produce Exchange, although conditions point to a larger proportion of business in December. There were sales of standard foundry contracts, 500 tons, for November and December delivery at $21.75. The following are quotations for standard foundry iron contracts on call.

Standard Foundry Contracts.

	Bid.	Asked.
November	.....	.....
December	.....	.....
January	21.00	23.00
February	21.00	23.00
March	22.00	23.00

Finished Iron and Steel. — New business in the heavier lines of finished material has not been of large volume, a condition which is, however, of no particular significance. It is only the natural lull between seasons and products of all kinds continue to move with a rush from the mills. Railroads have bought great quantities of rolling stock and equipment, all of which means a consumption of steel in one form or another. Orders for cars have been increased by several thousands, and many locomotives have been added to the list.

Nothing large has made its appearance in the structural market. The contracts for railroad bridges mentioned last week are still pending, and only small jobs have come to light. Industrial concerns are steady buyers of material for extensions and additions to manufacturing plants. The American Bridge Co. has booked a number of small orders of this kind and is figuring on others. At the present time the month does not promise to be a large one in the structural field, but the mills are not suffering for orders and next season's business is at hand.

New contracts for rails did not exceed 30,000 or 40,000 tons, mostly in comparatively small lots. Details will be given elsewhere in the present issue. Orders from trunk lines involving 100,000 tons or more are likely to be forthcoming within a few days; for negotiations have been proceeding for some time.

Plates, bars and all lighter shapes are in excellent demand. In the plate market nothing unusual has developed, but the regular demand is so active that premiums on small orders are not uncommon, and there is again talk of an advance in prices. Bar iron has been firm with increased pressure for shipment on old contracts. Mills are quoting 1.70c and 1.75c base Pittsburg.

The following are prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.84½c to 1.89½c; sheets, No. 28 black, 2.60c.

Old Materials.—The tone of the scrap market has improved during the week. Prices are stronger and consumers are more inclined to meet the views of the dealers. The reported settlement of strike difficulties at the mills has brought the demand which has been delayed, and the high price of pig iron has stimulated the need of cast scrap of all kinds. A sale of 300 tons of strictly machinery scrap is reported at $19.50 gross ton. Among other sales were 400 tons of stove plate at $13.75 and 300 tons of cast borings at $11. Business in heavy melting steel in shape for charging amounted to about 2,000 tons. The following are prices aproximately f. o. b. tidewater:

Old iron rails	$25.00 to 25.50
Old steel rails, long lengths	16.50 to 17.00
Old steel rails, short pieces	15.50 to 16.00
Relaying rails	25.00 to 26.00
Old car wheels	18.00 to 19.00
Old iron car axles	29.00 to 30.00
Old steel car axles	20.00 to 21.00
Heavy melting steel scrap	16.00 to 17.50
No. 1 railroad wrought scrap	19.00 to 20.00
Iron track scrap	18.00 to 19.00
Wrought pipe	13.50 to 14.00
Cast borings	11.00 to 11.50
Wrought turnings	12.50 to 13.75
Heavy Cast Scrap	17.50 to 18.50

BIRMINGHAM.

Very High Prices for Spot Iron. — Production not Materially Increased.

November 12.

Alabama furnace companies have very little, if any, spot iron to sell and reports are current that the quotations for what there is of this iron have gone up to something near $25, the high water mark for the district. Offers for 200 and 300 tons, immediate delivery iron, at $22 could not be accepted recently. There is still a lively inquiry for iron, delivery during the first and second quarters of the coming year. In some quarters the statement is made that if the sale continues as it has been for the past few weeks that the probable make for January, February and March will have been disposed of by the end of another month. The aggregate sale for the second quarter of the coming year is not so mean, either, and indications point to a demand for every ton of iron that can be manufactured.

Announcement was made during the past week by one of the smaller iron companies that it would be in a position to sell iron for delivery during the latter part of the first quarter.

The general conditions in the Birmingham district among the coal, iron and steel producers could hardly be much better. The prices are strong and high, the demand interesting and prospects bright. The only complaint to be made is in the transportation facilities both in and from the district and the inability to increase the production materially. Furnace companies in this section would be pleased if the output could be bettered twenty or twenty-five per cent, but this appears to be impossible. Furnaces nearing condition to be blown in will only take the places of others needing some repairing. The raw material supply shows but little improvement.

ST. LOUIS.

Car Shortage a Heavy Handicap.—Pig Iron Prices Vary Greatly.

November 12.

Pig Iron.—Despite the high prices, conditions in the iron market are far from satisfactory, both from the seller's and consumer's point of view.

Inquiries are far in excess of the probable make and with the first quarter practically sold up to the seller has little to do except await developments. If indications count for anything, the present taut condition will prevail through the winter and probably into spring. It seems that nothing aside from a liberal importing of iron can relieve the situation. To add to the actual shortage of iron the inability of the furnaces to get cars is a sore hindrance to deliveries.

Some furnaces are as much as ninety days behind on deliveries. No St. Louis agent is anything like up on deliveries and several of the smaller foundries which were not thoroughly covered have been obliged to shut down from time to time because of inability to get iron. Few of them are running full capacity. They are picking up what iron they can in the market, but it is commanding fancy prices. Twenty-three dollars is reported today for spot iron.

Prices cover a wide range, each individual furnace making a price of its own. There is a spread of from $1 to $2 between the different deliveries. Quotations for the first quarter including the freight rate of $3.50 to East St. Louis range as follows:

Southern No. 1	$23.50 to 24.00
Southern No. 2	23.00 to 23.50
Southern No. 3	22.50 to 23.00
Southern No. 4	22.00 to 22.50
Gray Forge	21.50 to 22.00

Coke. — Coke is more active and prices are higher. Some good contracts are pending. The price is $7.30, though a premium is sometimes paid for prompt delivery.

Finished Material.—The demand for building materials is much easier than it was on account of the approach of winter, but so many new projects are on hand that a stiff business for next season is insured. In fact, there will be so much of it that contractors will merely select that which seems to offer the best inducements. The most interesting project is that of the new National Bank of Commerce building, which will cover half a block and will be 16 stories tall. It will cost $6,000,000. Mauran, Russell & Garden were selected today to draw the plans. Wrecking will probably begin in the next two months.

LATE NEW YORK NEWS.

(Special Telegram.)

New York, Nov. 14.—Late rail sales are as follows: St. Louis Western, 7,500 tons; Louisville Eastern, 5,000 tons; miscellaneous, 10,000 tons.

Secaucus furnace was blown in Saturday.

Metal Market

NEW YORK.

November 13.

Pig Tin.—Buying has been largely by dealers and operators, but the aggregate sales have been considerable. Today's market was quiet.

The following are today's quotations. Spot, 42.70 to 42.85; November, 42.65 to 42.85; December, 42.65 to 42.95; January, 42.65 to 43; London, £195 5s and £196 15s. Arrivals for the month to date, 1,330 tons. Afloat, 2,960 tons.

Copper.—A firm tone prevails but consumers are apparently reluctant. Prices rule firm. Today's quotations: Lake, 21¾ to 22¼; electrolytic, 21½ to 22; casting, 21¼ to 21¾; London, £99 2s 6d and £100 15s. Exports for the month to date, 4,707.

Lead.—No change of importance is to be noted, the market being if anything a little quieter and easier. Today's quotations: 5.85 to 5.95; St. Louis, 5.90. London, £19 5s.

Spelter.—Refined spelter has been in better and firmer demand. Today's quotations: 6.30 to 6.40; St. Louis, 6.35; London, £27 10s.

Antimony.—There has been more demand and prices are firmer. Today's quotations: Cookson's 25½ to 26c; Hallett's, 24½c to 25c; other grades, 23½c to 24½c.

CHICAGO.

November 13.

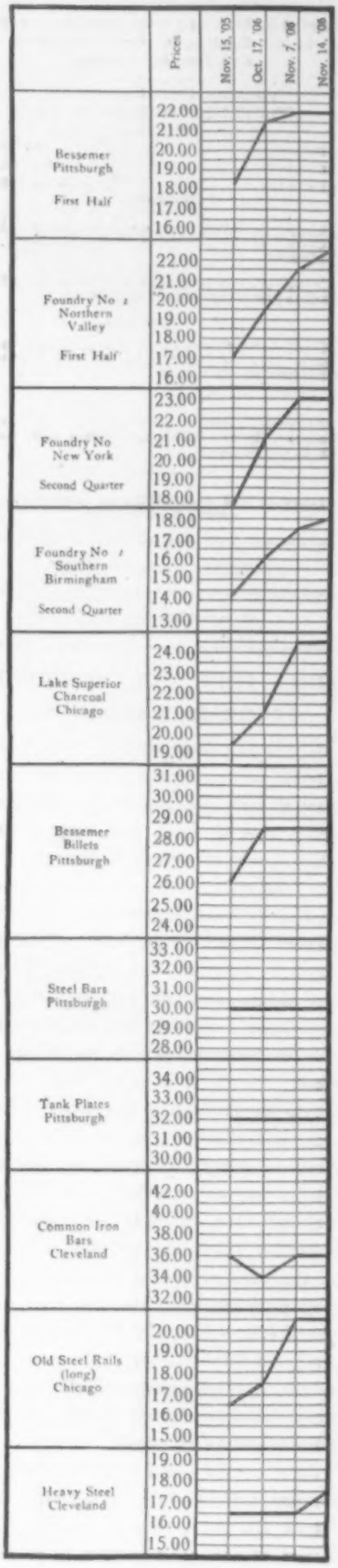
The market is very firm and buying is brisk. Spot shipments are hard to obtain. The only change is in pig tin, which is now selling at 45¼c for carload lots. Spelter is quoted 6.50c in carload lots; lead desilverized, 6.10c to 6.15c for 50-ton lots. Sheet zinc is unchanged at 7.90c list f. o. b. La Salle in carlots of 60-pound casks. Lake copper, 24c to 24½c; casting, ¼c to ½c lower. Antimony, 28c for Cookson's, and 26½c to 27½c for other grades.

The old metal market is practically unchanged. Prices are firm.

We quote dealers' buying prices, as follows: copper wire, 18½c; heavy copper, 18c; copper bottoms, 17c; copper clips, 17¾c; red brass, 17¾c; yellow brass, heavy, 13c; yellow brass borings, 12c; red brass borings, 13¾c; light brass, 10c; pipe lead, 5.15c; tea lead, 4¾c; zinc, 4½c; tin foil, 31c; pewter, No. 1, 25c.

The American Locomotive Co., at its Shenango plant, has just completed its 40,000th locomotive, a passenger engine for service on the Northern Pacific.

PRICE CHART.


Prices
Nov. 15, '05
Oct. 17, '06
Nov. 7, '06
Nov. 14, '05
Bessemer Pittsburgh First Half
22.00 21.00 20.00 19.00 18.00 17.00 16.00
Foundry No 2 Northern Valley First Half
22.00 21.00 20.00 19.00 18.00 17.00 16.00
Foundry No New York Second Quarter
23.00 22.00 21.00 20.00 19.00 18.00
Foundry No 2 Southern Birmingham Second Quarter
18.00 17.00 16.00 15.00 14.00 13.00
Lake Superior Charcoal Chicago
24.00 23.00 22.00 21.00 20.00 19.00
Bessemer Billets Pittsburgh
31.00 30.00 29.00 28.00 27.00 26.00 25.00 24.00
Steel Bars Pittsburgh
33.00 32.00 31.00 30.00 29.00 28.00
Tank Plates Pittsburgh
34.00 33.00 32.00 31.00 30.00
Common Iron Bars Cleveland
42.00 40.00 38.00 36.00 34.00 32.00
Old Steel Rails (long) Chicago
20.00 19.00 18.00 17.00 16.00 15.00
Heavy Steel Cleveland
19.00 18.00 17.00 16.00 15.00

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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November 15, 1906.

THE NEW CONSTRUCTION PROGRAM WARRANTED.

In the last issue of THE IRON TRADE REVIEW was presented a detailed summary of new iron and steel construction, which showed some very large totals. There being sometimes a disposition to look askance at such records, as representing promises rather than actual fulfillment in production, it is well at the outset to emphasize the fact that history has always recorded the fruition of a very large proportion of such plans, the only discrepancy being in the matter of time. Usually it is found that the increase in production has been greater than was called for by the plans set down on paper. Demand for iron and steel grows very rapidly. Men who are building have carefully surveyed their respective fields and are well convinced of the need of the new capacity which they propose; when the result of their united efforts is totaled the figures seem large, but this is so merely because these details can be summed, while the demand which each has found by his scrutiny cannot be added.

As the nearest case in point, it can be recalled that in July, 1902, THE IRON TRADE REVIEW presented similar summaries of new erection then in progress or definitely planned, which showed, among other things, additions to blast furnace capacity of 4,900,000 tons annually, and additions to open-hearth steel capacity of 3,100,000 tons annually. This new capacity was expected to become operative in 1903, but on account of the usual delays in construction, and because of the temporary decline in demand, the full fruition of this work was not felt until 1905, when the actual production of the United States showed an increase, over 1902, of 5,171,083 tons in pig iron, and an increase of 3,283,647 tons in open-hearth steel. The increase was about 200,000 tons more in both pig iron and open-hearth steel than the new erection and projects in 1902 foreshadowed. The actual results, therefore, fully bore out the presentment, as very little new construction was engaged in after that summary was compiled. The only discrepancy was in the matter of time, partly fortuitous, through the temporary decrease in demand, and partly from the delays to which construction work is naturally subject. In the presentation of last week there was due consideration of this general principle, and no effort was made to set forth any time in which the new capacity cataloged would become actually productive.

It would be possible to blame every depression, small or great, which has occurred in the American iron trade, upon too rapid increase in productive capacity, but on the other hand there has been a great deal more new erection, followed by times of good demand absorbing the new output, when the results would have been most unfortunate if the new capacity had not been provided. It is *ex parte* reasoning of the most unsound kind to attempt to develop a connection between new erection and depressions.

The totals representing new erection actually commenced or definitely planned, as presented last week, should therefore be accepted as certain to eventuate, in their own time, in increased production and not as indicating the probability of over-production, but rather as representing the testimony of foresighted conservative business men that this added capacity will be needed.

The blast furnace summary of last week showed:

	Stacks.	Annual Capacity.
Recently completed....	7	968,000
Under construction...	21	2,310,000
Authorized	27	2,965,000
Total	55	6,243,000

Besides the above there are four old stacks, with an annual capacity of 315,000 tons, which are to be started again. One is struck by the preponderating number of new furnaces built and projected by steel companies, but an analysis shows that about 40 per cent of the new erection is by merchant furnace interests. In 1905 the production of all grades of pig iron outside of standard Bessemer, basic and the manganese metals was 36.8 per cent, so that if the new merchant stacks made no iron for the steel works the old relation would be maintained. While it is the expectation of some of them to make some steel-making iron, the plans can be changed readily. Furthermore, with so much new erection on the part of steel interests, some of the steel-making pig heretofore purchased in the open market can be released, and the problem of the relative supply of steel making to foundry iron can adjust itself. A more important matter is the rapidly increasing quantity of Bessemer and basic iron called for by the steel casting interests. Their buying has had much to do with the recent advance in Bessemer and basic pig, which has put these grades above their usual relation with foundry iron, partly because their purchases were unexpectedly large. It is asserted, also, that basic pig is being used to a considerable extent at present by malleable iron foundries.

It has been the same with new construction of open-hearth steel furnaces as with new construction of blast furnaces. The summary of last week showed the following in open-hearth construction:

	Furnaces.	Annual Capacity.
Recently completed..	21	530,000
Under Construction...	47	1,016,000
Authorized	30	1,194,000
Total	98	2,740,000

The new erection of blast furnaces and open-hearth steel furnaces will be felt slightly in the production of the present calendar year. The entire program of blast furnace erection cannot be expected to be operative before 1908 at the earli-

est, but the new open-hearth furnaces can easily be counted upon for that year. The idea is more or less prevalent that 1908 will not be as good a year as 1907 in the iron trade, for various reasons. The one based upon its being a presidential year has some support in history. In the 26 years elapsing since 1880 there have been nine off years, in which pig iron production did not break previous records. There were six presidential years, and four of them were off years. In other words, in a quarter of a century two-thirds of the presidential years have been off years for pig iron production, while but one-fourth of the other years have been off years. Possibly there will be, as after the heavy new erection which was scheduled in 1902, a brief relapse, the new plant being fully employed thereafter, say in 1909. Then it could be said, that whereas we made 23,000,000 tons of pig iron in 1905, and are making over 25,000,000 tons this year, in 1909 we can and will make more than 31,000,000 tons; that whereas in 1905 we produced 9,000,000 tons of open-hearth steel, and are making 10,000,000 tons this year, we can and will in 1909 produce more than 13,000,000 tons. Doubtless the time will come when the American iron trade will suffer a severe relapse, with a period of several years of depression, but that time is well in the future, and the present new erection will have probably quite passed into history before it arrives.

WHAT THE ANTI-JAPANESE AGITATION MAY MEAN.

Is the rowdy agitation against Japanese school children and all things Japanese in San Francisco to be allowed to destroy our iron and steel and machinery trade in the Orient? That is a question which has been too long neglected. In fact it is becoming evident that trade interests not only in Japan but aso in China, Corea and Manchuria have already suffered irreparable damage, and at present a general boycott against American goods seems inevitable.

The hooligans and the trade unions of the Pacific coast have badgered and browbeaten the poor Chinamen for years with impunity, but Japan is not China. The Japanese are the most sensitive people on earth and their sense of honor is something very different from that of the western races. Commercial gain, material welfare, or even life itself is as nothing compared with national honor, and the most chauvinistic American must admit that in this case Japan has a real grievance. It will do no good to explain that the San Francisco hoodlums are not representative of our people as a whole. The citizens of Japan are a unit to a degree of which we in our heterogeneous communities can scarcely conceive. The humblest coolie is still a Japanese, and we as a people are held strictly accountable for the attempt to classify the Mikado's subjects as an inferior race.

Our practical politicians could make no graver mistake than to minimize the danger with the remark that sentiment will not interfere with business. The situation is extremely serious. A Japanese boycott directed against our machinery will be far more grave in its results than the Chinese difficulty which has not yet entirely disappeared. If Japan closes its doors against our goods, Corea and Manchuria will surely follow and it is more than probable that China will also take a hand. It is not necessary to speculate as to what that will mean to our industries and especially to the seaports of the Pacific coast.

But there are considerations even more serious than the mere contraction of foreign trade. The hostility of the mightiest nation in Asia is no laughing matter. The safety of our Pacific colonies and the peace of the world are endangered by this irresponsible breach of international law and etiquette.

The confidence of one great railroad in the continuance of prosperity is shown in the action of the Pennsylvania in increasing wages of eastern employes 10 per cent, or $8,500,000 per year. The early increase of the wages of employes west of Pittsburg, will raise this amount to $12,000,000. The recent increase of dividend from six to seven per cent involves an additional outlay of $3,000,000 a year.

LaBELLE IRON WORKS.

Will Add New Mills, Largely Increasing Its Capacity.

The LaBelle Iron Works, Steubenville, O., will break ground next week for the erection of two new jobbing mills and eight sheet mills, the monthly capacity of which will be about 52,000 tons of finished material. Contracts for the new mills were closed on Tuesday of this week and it is expected the new capacity will be in operation within five months, with a full line of all classes of light sheets. A galvanizing department is included in the improvement.

The new capacity consists of one 28-inch train composed of one each 60-inch roughing mill, 60-inch finishing mill, 28-inch pinions, 54-inch roughing mill, and 54-inch finishing mill. The 28-inch mills will be driven by two engines and will be as follows: two 44-inch finishing mills, two 44-inch roughing mills; four 38-inch finishing mills, four 38-inch roughing mills; two 32-inch finishing mills and four stands of pinions.

Three new 24-inch cold mills will be operated by separate engines.

The company now has an 84-inch three-high plate mill and a 72-inch, three-high plate mill and the new additions just decided upon will give the company a total of twelve mills in one continuous building.

SOUTHERN LABOR SITUATION.

In the south, the labor situation is still causing some discussion. The Birmingham Commercial Club has named a committee to go to New Orleans to investigate the arrival of a ship in the near future bringing a large number of immigrants from Italy, the statement being made there might be some desirable labor in the large number of men coming to this country. Italian labor has been tried recently in ore mines and at common work around furnaces and found to be quite acceptable. Many cities are represented this week at the Southern Immigration convention being held at Nashville, Tenn., the object of the convention being to discuss ways and means of attracting good immigration for that section of the United States. Some of the larger industries would be operating day and night turns if there was sufficient labor.

Forty contracting managers of the American Bridge Co., with J. A. Hatfield, president, held a business session in Chicago last week, reviewing contracts made by the company during the past year and discussing other methods pertaining to the sale of the company's products.

REPUDIATED

IS MOLDERS' STRIKE BY AN OFFICIAL ORGAN.

Plain Truths Forcibly Presented and Fairness of Employers Strongly Commended.—Result of Careful Investigation.

The following address to the public has been issued by Milwaukee employers:

To the Public:

The iron molders' strike against the foundrymen of Milwaukee and elsewhere has failed in every city, but more particularly in St. Paul and Minneapolis. In the latter city there is a paper called *The Union*, which for 21 years has been the organ of the labor organizations of Minneapolis, and it is now the official paper of the Building Trades Council. This paper on Nov. 2 came out openly and acknowledged that the strike was a mistake, and we have reproduced the article verbatim in order that the public may read labor's own version of the strike.

The conditions in Milwaukee are identical with those of Minneapolis and St. Paul previous to May 1 last, when the strike was inaugurated, except that about 1,100 men were involved here as against 400 in those cities.

In Milwaukee as in the Twin Cities, the molders have lost the strike. The shops are full of competent men who are turning out satisfactory work. In place of union or closed shops, we now have 18 open shops, where the union man as well as the non-union man will be employed, paid competent wages and treated justly.

ALLIS CHALMERS CO.
FILER & STOWELL CO.
VILTER MFG. CO.
BUCYRUS CO.
THE FALM CO.
SMITH STEEL CASTING CO.
PAWLING & HARNISCHFEGER
FRED M. PRESCOTT STEAM PUMP CO.
J. A. & P. E. DUTCHER CO.
B. HOFFMANN MFG. CO.
R. J. SCHWAB & SONS CO.
SHERIFFS MFG. CO.
MILWAUKEE STEEL FOUNDRY CO.
STOWELL MFG. & FDY. CO.
WESTERN MALLEABLE & GREY IRON MFG. CO.
CRUCIBLE STEEL CASTING CO.
SPIECH STOVE REPAIR CO.
NATIONAL BRAKE & ELECTRIC CO.

The article published by *The Union* is in part as follows:

"In our efforts to deal fairly and justly with the organized workingmen, and also with the employers, we have been led to investigate the justice and reasonableness, or the lack of it, of the causes which have led up to some of the strikes which have occurred in the Twin Cities during the past few years. Among the others, we have investigated the strike ordered by the molders in the machine shops and foundries of Minneapolis and St. Paul. We have been forced to the conclusion, after interviews with some of the leading members of the organization, that the strike was almost or quite as unreasonable and foolish as the one which occurred in the flour mills, and which we have already had occasion to denounce.

"It is apparent that in this trouble, the members of the organizations were misled by a few radical, hot-headed officers, who thought more of their own particular ends, whatever they may have been, than the general welfare of the membership.

"We find that the only point of disagreement was because the employers would not sign an agreement for a closed shop, a condition already in existence, and to which they made no objection. They had agreed to let conditions remain unchanged, which means the same thing, and the members were satisfied that they were dealing with men of honor, and that their word was all that was required. In spite of this fact, and in spite of the fact that the international president, Mr. Jos. Valentine, who is himself considerable of a radical, had telegraphed the organizations not to strike, this unwise, irresponsible officer, in an impassioned speech, urged the men to ignore the commands of their superior officer, and to engage in a strike which he must have known, if he is possessed of even the average common sense, was not justified, and which must fail. In the face of the orders of their international president not to strike, and in spite of the protests of the abler and wiser men, who had guided the organizations through many conferences with the employers, and who knew that foundrymen of the Twin Cities were inclined to be fair, and even liberal, with their workingmen, the radical element carried the day, as has been too frequently the case with organized labor.

"In consideration of this fact, it may be only a fair question to ask why the international officers did not have the moral courage to refuse to sanction the action of this insubordinate union, and order the men to return to work, and discipline the radicals who had led them into the unjustifiable position. It seems another case of upholding any action which a union may take, whether it be right or wrong, and is a position which no international organization can afford to take.

"The result has been that instead of the organizations, having control of the shops and foundries of the Twin Cities, and instead of from 350 to 400 well paid, contented union men at work at good wages, and a strong, progressive union, the unions have lost control of a majority of these foundries, and many of the members have lost situations which they can never hope to regain, and are compelled, many of them, to either be without work, or to work at other trades or such odd jobs as they can find to do. Many who had purchased homes which were partially paid for, have lost what they had invested in them, and have been compelled to leave the city, and many happy and comfortable homes have been ruined. After a fair investigation, and from what we can learn from interviews with those in a position to know the exact conditions, and the real inside history, we are candidly of the opinion that the strike was without any sufficient cause—that it was forced upon the employers, who were willing to make any reasonable concessions, and to deal fairly with their men.

"Some of the best unions in the city and state have been disrupted by incompetent, irresponsible leadership, and we hope to be able to point out a better way of dealing with labor disputes. We sincerely hope the molders will be able to secure more competent, experienced leadership, before their organization is entirely disrupted."

In Buffalo Foundries.

The Buffalo Foundry Co. is the latest foundry in that city to declare for the open shop. Since the strike of May 2, this year, this foundry had continued as a union shop and has turned out heavy work. The company now employs about 75 men in its foundry on a strictly open shop basis and union men and non-union men are now working side by side in harmony. Considerable work is being done for the Allis-Chalmers Co., of Milwaukee, some of the castings weighing 90 tons.

Buffalo foundry managers have posted a number of uniform open shop notices authorized by the Buffalo Foundrymen's Association. These notices clearly define the attitude of the proprietors and the rules which must govern the open shop. Since May 2 twelve concerns have declared for the open shop and they are continuing operation on that basis.

In the case of the Buffalo Foundry Co. an attempt was made by the molders' union to interfere with non-union men who had been engaged to take the place of strikers This resulted in an injunction being granted forbidding such interferences. An effort was made by the union to have the injunction vacated but this motion was denied a few days ago by

Justice Kenefick, of the Supreme Court at Buffalo.

Labor Shortage Banks Furnace.

The Pioneer Iron Co., Marquette, Mich., recently banked its Carp Furnace for about two weeks on account of shortage of men in the woods. The labor problem is causing embarassment in the northern Michigan lumber district to such an extent that recent bids of $45 a month failed to secure all the men needed in logging operations in Baraga county. In some instances contractors are declining to cut logs this winter owing to the high wages demanded. The lumber shortage is given as the reason for recently laying off some 600 men at the Detroit shops of the American Car & Foundry Co.

Railroad Strike Averted.

Railway switchmen will receive an additional four cents an hour under the new schedule of wages which will become effective Nov. 15. It is estimated that about 25,000 switchmen will be affected, and that the increase in wages will amount to nearly $6,000,000 a year. The granting of this increase checks the strike which for a time threatened serious trouble to switchmen throughout the country.

Voluntary Wage Increases.

A number of voluntary wage increases have been announced during the past week. Two hundred molders and car makers of the Weatherby Car & Foundry Co., Haselton, Pa., have received a fifteen cent a day increase, and the Reading Iron Co., Reading, Pa., states that a general advance will result from a revision of schedules now under way, some 3,000 men being affected. The Pennsylvania railroad advances, announced last week, will benefit more than 150,000 employes, and the Standard Oil Co. has also made large increases.

Labor Notes.

Twice during the past week police were called to the plant of the Jeffrey Manufacturing Co., Columbus, O., to prevent violence being done a number of strike breakers in its employ. A number of shots were fired on the evening of Nov. 9, and one officer was injured. Picketing at this plant has been unusually active of late.

Striking iron molders at Kansas City have been enjoined from interfering with non-union workmen at the Armourdale foundry and the plant of the H. N. Strait Manufacturing Co.

A short-lived strike occurred recently at the plant of the American Foundry Co., Rockport, Ill., because of the dismissal of a molder.

NEEDS OF THE RAILROADS.

More Cars, More Trackage.—Notable Address of James J. Hill.

James J. Hill, speaking at the Merchants' club dinner in Chicago last Saturday evening, discussed as follows an editorial in the *Chicago Tribune* of Nov. 10.

"In brief, the editorial presents the railroad side of the case. The *Tribune* has taken hold of the question intelligently. It has seen the point. It has noticed that from June 30, 1895, to June, 1905—ten years—the growth in ton mileage was 110 per cent. The growth in the mileage of railroads to handle that traffic was 20 per cent.

"There's where you stand today — you can see it in that brief comparison. There's where the whole country stands. The traffic of the country is congested beyond imagination. The commerce of the country is paralyzed, and, continued, it means slow death.

"More cars? Yes, we need more cars, but we need also cars of greater capacity, heavier trains, and more miles of railroad to haul them over. In ten years the railroads of the country expanded 20 per cent for the handling of a business that increased 110 per cent. Suppose you are able in the near future to increase that expansion 50 per cent? That will still leave 40 per cent a year of the business without any facilities for taking care of it.

"It is estimated that from 115,000 to 120,000 miles of track must be built at once to take care of this immense business. But to build that amount will cost as much as the civil war cost, at least. It will cost from $4,000,000,000 to $5,000,000,000. A thousand millions of dollars a year for five years will scarcely suffice. Why, there is not money enough nor rails enough in all the world to do this thing.

"And if the rails were piled up ready for the undertaking, and if the money were in bank today, it would be impossible to get the labor with which to do it.

"I tell you there is no question since the civil war of half the consequence of this one. Why, you can't go out and contract with any railroad in this country to move 500 cars of freight from here to New York in thirty days. And the railroad could not deliver if it should contract to do it.

"The great cry is that there are not cars enough. The trouble is that you can't put cars on the track and get half the movement out of them that you could ten years ago. Statistics show that freight cars running from twelve to fifteen miles an hour average a movement of twenty-five miles in twenty-four hours. Think of it—only two hours a day in operation. Is there any business in the world that can sustain itself when its equipment is in use only one-twelfth of the time?"

COLORADO FUEL & IRON CO. NEWS.

(Special Correspondence.)

Pueblo, Col., Nov. 12.—The Colorado Fuel & Iron Co. is vigorously pursuing a campaign of repairs and improvement at its steel works plant at Bessemer, a suburb of Pueblo, Colo. Repairs on blast furnace A are being pushed so rapidly that it is believed the furnace will be in operation before the end of the present month. The mechanics are awaiting the arrival of castings which are expected in a few days. Work on blast furnace F is also being rushed, but it is impossible at present to state the exact date when it will be completed.

Despite reports from the east of a pig iron famine, the company is receiving all the ore it can handle from its own mines. The Bessemer plant is running its maximum of 4,000 men in all its departments in order to handle all iron ore available.

Work on the pipe line from reservoir No. 2 to the Bessemer plant has progressed so rapidly that the line will be completed this month. The steel works uses almost as much water as the entire city of Pueblo, with its 65,000 population, and the problem of water supply is one of the most important that the management has to consider. When the new reservoir is completed the water supply will be adequate for all purposes of the plant for many years to come.

No Danger to Ships.—The federal grand jury at Pittsburg has returned indictments against Frank L. Emmet, James J. Dunn and Charles L. Close, charging them with conspiracy to defraud the United States government by passing defective boiler tubes from the Shelby Steel Tube Co.'s plants at which they were at one time employed. A number of these tubes, it has been charged, are at present in several large battleships, but Rear Admiral Ray, engineer-in-chief of the navy, declares this impossible, as the tubes are subjected to two inspections after leaving the place of manufacture, and then finally given a heavy physical test to be certain to bring out any defects.

STEADILY IMPROVING.

(Continued from page 1.)

foundries satisfactorily in the face of bitterly conducted strikes. Nothing could have been more enthusiastic than the character of the reception accorded Mr. Briggs' statement, showing how completely those present were in harmony and how enthusiastic is their admiration of the work now being done. Brief addresses were made by a number of other alumni, all in an enthusiastic vein.

A partial list of those attending follows: M. H. Barker, C. Bermingham, O. P. Briggs, E. Burkitt, H. A. Carpenter, H. Cockshutt, H. N. Covell, Thomas E. Durban, G. E. Emmons, F. B. Farnsworth, Stanley G. Flagg Jr., Isaac W. Frank, George M. Gillette, William S. Hallowell, W. N. Herendeen, John L. Ketcham, O. B. Kinnard, O. P. Letchworth, Edgar McDougall, James McNaughton, R. C. Oliphant, John A. Penton, Antonio C. Pessano, C. M. Power, Irving H. Reynolds, John R. Russel, W. D. Sargent, W. D. Sayle, F. W. Sivyer, C. R. Stephens, Joseph A. Stone, John M. Taylor, William M. Taylor, George Q. Thornton, H. M. Wallas, George W. Watts, J. H. Webster, A. E. McClintock, and F. W. Hutchins.

In Satisfactory Condition.

Sessions of the administrative council occupied all of Monday and Tuesday and were remarkably well attended, there being only two absentees out of almost a score of members. With Mr. Briggs presiding, the council disposed of a large amount of accumulated businesses, mostly of a routine character, went over the official reports and discussed the association's work during the past year and for that to ensue. The reports showed the organization to be in excellent condition and the situation in the strike districts was stated as very satisfactory and steadily improving. In the Buffalo district a dozen foundries which recently inaugurated the open shop are operating with gratifying results, finding that green men broken in after the declaration of the strike have proven unexpectedly efficient and that larger outputs than under the old regime are the rule. The strikers have given up the contest and molders are plentiful. Similar conditions prevail in the Milwaukee district. The work of the council was completed Tuesday afternoon, and the convention opened Wednesday morning with an excellent attendance.

The Green and Shenango tin mills at New Castle, Pa., were closed Nov. 10, notices being posted stating that this was due to inability to secure coal, owing to the shortage of cars.

THE RAPID TRANSIT POWER HOUSE IN PHILADELPHIA.

The new power house being built by the Philadelphia Rapid Transit Co. at Delaware avenue and Laurel street will be fitted with steam power and electric generating machinery by the Westinghouse companies. The plant will supply all the current required to operate the Philadelphia elevated lines and the subway lines on Market street and will have in addition an abundance of power in reserve for other purposes.

The Westinghouse Electric & Mfg. Co. has already furnished two 9,000-horsepower turbo-generators and two more of the same capacity and type are now under construction. The same company will furnish the switchboard appliances and several transformers and exciter sets. The Westinghouse Machine Co. has supplied two Westinghouse Parsons steam turbines of 10,000 horsepower each and two more of the same size are under construction.

The power plant will have eight reinforced concrete stacks each 251 feet high and each to serve a battery of eight boilers of 800 horsepower each. Each chimney, it is estimated, will furnish natural draft for the consumption of 25,000 pounds of coal per hour.

ENGINEERING TOURS.

Harrisburg, Pa., Nov. 13.—The engineering clubs of central Pennsylvania have lately been making pilgrimages, a custom which bids fair to be permanent hereafter. Late in October the Engineers' Club of central Pennsylvania, of Harrisburg, visited the Lebanon and Cornwall regions, being guests of the Pennsylvania Steel Co., Lackawanna Iron & Steel Co., Cornwall Ore Banks, Ltd., Lebanon Machine Works, American Iron & Steel Manufacturing Co., Lebanon Chain Works and other concerns in the county. The day was spent at ore banks, furnaces and mills, over 100 being in the party.

On Saturday the Scranton club visited Berwick where it inspected the plant of the American Car & Foundry Co. and through the kindness of Guy E. Webster, the new plant of the York Bridge Co.

The Leather Belting Manufacturers' Association will meet on Wednesday, Nov. 21, at the Fifth Avenue hotel, New York. Samuel Fleischman, of New York, Charles O. Alexander, of Philadelphia, and Milton H. Cook, of San Francisco, will be the principal speakers. The session will begin at 2 o'clock, and an informal banquet will be served at 5:30

GOMPERS' POLITICAL FAILURES.

Speaker Cannon, of the National House of Representatives, marked for slaughter by President Gompers of the American Federation of Labor, was re-elected without any effect of the labor blacklist being noted. Representatives Mudd of Maryland, Dalzell and Lafean, of Pennsylvania, Lilley, of Connecticut, and others on the Gompers list were also re-elected. Two labor candidates in Pennsylvania were successful, and Representative Babcock, of Wisconsin, was defeated, this being due however, to factional party troubles in his state. These results, in connection of the recent return of Mr. Littlefield to congress in the face of Gompers' opposition and the fact that the entrance of the Federation of Labor into politics with such indifferent success has developed a movement to oust Mr. Gompers from the presidency, indicate that the federation's efforts in the fall campaigns have failed signally.

Coking Coal Lands Bought.—The Youngstown Sheet & Tube Co. and the Andrews & Hitchcock Iron Co., Youngstown, O., have closed a deal whereby they acquire 2,500 acres of coking coal lands in Cumberland township, Green county, Pa. The Sheet & Tube company, it is understood, secures about 1,375 acres of the tract. While the purchase was made from J. V. Thompson and associates as one lot, the two purchasers will have their separate apportionments. It is not the intention to build ovens in the immediate future. The property is along the projected Wheeling Short Line railway.

Philadelphia Foundrymen. — The monthly meeting of the Philadelphia Foundrymen's Association, which was held at the Manufacturers' Club on the evening of Nov. 7, was largely taken up with the annual survey by A. E. Outerbridge, the well-known metallurgist, of a year's progress in the steel and iron trades, with some references also to copper, aluminum and other important metals. Dr. B. B. Brown, chairman of the entertainment committee appointed to arrange for the proper reception of the annual convention of the American Foundrymen's Association next June, reported that a meeting had been held, but nothing decided upon as to the program for entertaining the delegates. A brief discussion as to what could be done with burned foundry sand brought out a general agreement that it was very excellent material for making concrete floors, and for nothing else.

FURNACES SHUT DOWN.

Dominion Iron & Steel Co. Has Trouble Obtaining Coke Supply.

(Special Correspondence.)

Toronto, Can., Nov. 12.—The blast furnaces of the Dominion Iron & Steel Co. at Sydney, N. S., were banked Nov. 2 and have since remained idle. The reason assigned by the company is want of coke, owing to the supply of coal received from the Dominion Coal Co. having been rejected as unfit for use. The difficulty is the outcome of long-continued friction between the steel and coal companies, although they are closely associated, several of the steel company's directors being also on the board of the coal company. Two years ago an agreement was arrived at by which the coal company agreed to supply the steel company for a period of 99 years with sufficient coal to run the furnaces at $1.24 per ton, subject to periodical increases every five years in case the wages of the coal miners should increase in the meantime. It is known that the terms of this agreement have been regarded as irksome by the coal company, as it can easily dispose of the entire output of its mines to better advantage. It appears that the source of supply from which the coal was furnished has recently been changed, and in place of coal from the company's reserve mine, which has the minimum of sulphur, coal from other mines was supplied, which having a larger percentage of sulphur, put the Dominion steel company to greater cost and trouble in preparing it for furnace use and was consequently rejected. The trouble is intensified by personal antagonism between James Ross, president of the coal company, and F. P Jones, general manager of the steel company. The rail mill, chemical works and cement works are also idle, and a number of the skilled workmen are leaving for the west.

Building contractors in Montreal find their work greatly delayed owing to the difficulty in securing supplies of structural steel. This is partly at least owing to the shortage of cars causing delays in shipments.

The Dominion Radiator Co., of Toronto, has secured a new site in order to expand its business. It will locate on Dufferin street in the northwestern outskirts of the city, where it will expend $200,000 on a new factory and employ about 500 hands.

Among new industries being established in Ontario are the following: Standard Fitting Co., Guelph, largely composed of local capitalists, which will manufacture steam and gas fittings, etc., employing 60 men; Kemp Mfg. Co., Stratford, which will take over the old Kemp factory, belonging to the Massey-Harris Co., and manufacture agricultural implements, the bonds being guaranteed by the city; Meisel Mfg. Co., Port Arthur, which will manufacture mill machinery and heavy harvesting machinery, Port Arthur having undertaken to guarantee its bonds for $75,000.

A new discovery of a large body of magnetite iron ore, 150 feet in width has been made in Snowden township, Haliburton county, Ont., about three quarters of a mile from the Irondale & Bancroft railway. A claim has been staked by William Robinson who will proceed to develop the property. There are a number of iron mines now being worked in this district.

NAMES FOR NEW FREIGHTERS.

The Pittsburg Steamship Co., in the case of the four 600-foot steel freighters now under construction, has followed its usual custom of naming its new vessels in honor of prominent men in the industry. The names selected for the four boats are: George F. Baker, Henry Phipps, Thomas Lynch and Thomas F. Cole. Mr. Baker is president of the First National Bank, New York, and a member of the finance committee of the steel corporation. Mr. Phipps is also a member of the finance commitee and has many years been a prominent figure in steel making. Mr. Lynch is president of the H. C. Frick Coke Co., and Mr. Cole is president of the Oliver Iron Mining Co., the iron ore branch of the corporation. The vessels will be ready for operation at the opening of navigation.

THOMAS LYNCH, PRESIDENT OF THE H. C. FRICK COKE CO.

DEATH OF EDWARD F. MILLIKEN.

Edward Fullerton Milliken died Saturday morning, Nov. 10, at the New York hospital, where he had recently undergone an operation for appendicitis. He was vice president and a director of Milliken Bros. (Inc.). From his youth Mr. Milliken was prominent in the iron and steel business in this country. In 1879 he was admitted into partnership in his father's business, and from 1887 he and his brother, Foster Milliken, continued the business alone, until January of this year, when it was incorporated under the name of Milliken Bros. (Inc.). Mr. Milliken was an earnest, active worker, and kept in close and sympathetic touch with his employes, who esteemed him highly. About the time the corporation commenced the construction of its new open-hearth steel rolling mills, which are now in operation, Edward F. Milliken resigned the presidency of the company in favor of his brother, Foster Milliken, who for the past few years has had under his more immediate direction the general management of the business. Mr. Milliken was a civil engineer and a member of many clubs and societies. He was in his forty-fourth year.

Shipments of Pig Iron to America.—The almost unprecedented demand from America for British pig iron has had a marked effect upon the exports from the Liverpool district. The following figures represent consignments to America from Liverpool alone in dollar value: September quarter, 1906, $1,182,004; June quarter, 1906, $1,162,202, and September quarter, 1905, $332,317. It will be seen that the increase over the September quarter of last year amounts to $849,687. From the northern British ports, there are also being made heavy shipments of pig iron to United States and Canadian ports.

Armor Plate for Italy.—As the result of the award to the Midvale Steel Co. of a large contract for warship armor plating for the Italian navy, a bitter political controversy has arisen in which the Italian Steel Works at Aurin play a prominent part. Legal proceedings, based on the claim that the method of manufacturing armor was owned by the Krupps and by the Italian company as co-proprietors, were threatened. Officials of the Midvale company went to Rome to make assurances that its armor plate is manufactured by a process exclusively its own.

PERSONALS.

J. W. Duntley, president of the Chicago Pneumatic Tool Co., is in Europe.

Isaac Krewson, superintendent of the plant of the Penn Shovel Mfg. Co., Warren, O., has resigned.

Powell Stackhouse, president of the Cambria Steel Co., has returned from an inspection of the company's iron ore properties.

David T. Morgan, manager of the Republic mine of the Cambria Steel Co., has resigned, and about Jan. 1 will go to California.

George Stahlnecker has been appointed superintendent of the new blooming mill of the New York State Steel Co., Buffalo.

T. S. Penny, manager of the Aetna Foundry & Machine Co., Warren, O., has resigned and has taken a position at Ford City, Pa.

Frank Dickerson, district sales agent of the American Sheet & Tin Plate Co., New York, sailed Nov. 3 for a short trip through southern Europe.

M. McCarthy, formerly superintendent of mines for the Tennessee Coal, Iron & Railroad Co., has been appointed manager of the Globe Consolidated Co.

Barton L. Keen has been made assistant to President R. B. Boland of the Birmingham Machine & Foundry Co., Birmingham, Ala. He assumed his duties Nov. 1.

R. B. Miller, for many years with the Sloss-Sheffield Steel & Iron Co., at North Birmingham, has become associated with the Cincinnati office of Hickman, Williams & Co.

Edward H. Hargrave, of the Cincinnati Tool Co., has started on an extensive tour of South America. He will visit the principal cities on both the eastern and western coasts, and expects to return about the middle of April.

L. F. Beers has succeeded H. M. Brightman as manager of the Detroit office of the Buffalo Forge Co., Mr. Brightman now being associated with the Terry Bending Engineering & Construction Co., Grand Rapids, Mich.

George H. Beeson, auditor of the General Hocking Coal Co., and the Imperial Fuel Co., has resigned to accept the position of auditor of the Jeffrey Manufacturing Co., Columbus, O. The change will be made Dec. 1.

John C. King, head of the brokerage firm of John C. King & Co., New York and Chicago, will retire from business on Jan. 1. He was instrumental in the promotion of the American Tin Plate Co. and of many other large industrial concerns.

Chas. K. Cooper, who was chief engineer for sixteen years of the Mutual Life Co.'s buildings, has resigned his position and is now associated as consulting engineer with the American Air Compressor Works, New York City.

Homer A. Wessel, Jr., president of the Cincinnati Railway Supply Co., Cincinnati, has been made sales agent of the Hazard Mfg. Co., 71-73 West Adams street, Chicago, succeeding Robert A. Pect, who has resigned to engage in other business.

Alexander B. Scully, president of the Scully Steel & Iron Co., Chicago, successfully underwent a serious operation at the Presbyterian hospital in that city last week. He is improving rapidly and is expected at the office again in two weeks.

F. W. McKee, secretary and treasurer of the Beaumont Iron Works, Beaumont, Tex., has resigned and will return to the H. W. Middleton Co., Philadelphia, which he left three years ago. C. A. Ganoung has been elected to succeed him both as secretary and treasurer and as a director.

M. M. Richey, vice president of the Sloss-Sheffield Steel & Iron Co., has resigned and will take service with the Southern railway again. J. C. Maben, president of the Sloss-Sheffield company, is traveling abroad and no announcements are made as to the vacancy. J. W. McQueen is also vice president of the Sloss-Sheffield Steel & Iron Co., as well as general sales agent.

Eight members of the Buffalo Foundrymen's Association left Buffalo Monday night for New York to attend the annual meeting of the National Foundrymen's Association. Another delegation left in time to attend the first day of the convention. Those who got away with the first delegation were John E. Gorss, L. P. Hubbel, W. E. Barr, H. W. Miles, T. L. Richmond, F. R. Dunn, Henry Wendt, Peter Ginther.

The fourth annual meeting of the Association of American Portland Cement Manufacturers will be held at the hotel Astor, New York, Dec. 11 and 12. The headquarters of the association are in the Land Title building, Philadelphia, Pa.

Manufacturers of Detroit have proposed that a manufacturer's club be formed in that city as a bureau of the board of commerce, its work being to take up matters affecting the industrial advance of Detroit.

OBITUARIES.

George Dengler, foreman of the bridge shops of the Eastern Steel Co., was killed Nov. 1 by a falling beam.

John Price Weatherhead, one of the founders of the Lehigh Zinc Co., and later a director in the New Jersey Zinc Co., died Nov. 9 at his home at Philadelphia.

Mrs. Jeanet Tesler Chalmers, widow of Thomas Chalmers and mother of W. J. Chalmers of the Allis-Chalmers Co., died Nov. 8 in Chicago, at an advanced age.

Clifton A. Verner, a director of the Pittsburg Valve & Fittings Co., and prominently connected with other business enterprises of Pittsburg, died recently at his home in that city.

William B. Crowe, a well known machine shop superintendent, died Nov. 6 at the city hospital, Youngstown, O., after an operation. For the past year he had been in charge of the machine shop of the Youngstown Foundry & Machine Co., before that time being connected with the Mahoning Foundry & Machine Co., a steel mill at Middlesboro, Ky., the Homestead Works of the Carnegie Steel Co., and the William Tod Co.

Carleton Walworth Nason, president of the Nason Manufacturing Co., died of pneumonia Nov. 4 at his home, No. 118 East 72d street, New York. The Nason Manufacturing Co. was organized by Henry R. Worthington and Joseph W. Nason, father of the deceased. Mr. Nason was a member of the Society of American Engineers and president of the Motor Cycle Club. He was a member of the New York and Atlantic Yacht clubs and of the Eastport Country Club. He was a widower without children and was 57 years old.

The net increase in railroad mileage during 1905, according to Poor's Manual, was 4,946 miles, making the aggregate mileage Dec. 31, last, 217,341 miles. Stock capitalization increased $294,912,000 and bonds $359,152,000. Gross earnings on the 215,506 of operated roads were $134,559,000 larger than in 1904, and net earnings $46,224,000 larger. Increased dividends called for $5,368,000 and the aggregate surplus gained $29,256,000.

In our issue of Nov. 1, it was announced that Julian V. Wright had been appointed commissioner of the National Metal Trades Association, which was incorrect. Mr. Wright was made assistant commissioner.

THE JOLIET PLANT OF THE ILLINOIS STEEL CO.

RECENT ADDITIONS AND IMPROVEMENTS IN VARIOUS DEPARTMENTS

Comprise a New 500-Ton Blast Furnace, a Nut and Bolt Mill, and a Rail Joint Plant for Continuous and Wolhaupter Joints.

During the past year the Illinois Steel Co. has made a number of additions and improvements to its Joliet plant. These include a new 500-ton blast furnace, a new track-bolt and nut plant and a new rail splice-bar mill. In the construction of these various improvements extremely rapid work was done. Ground was broken for the blast furnace on the first day of February, 1906, and the furnace blew in on September 1, last.

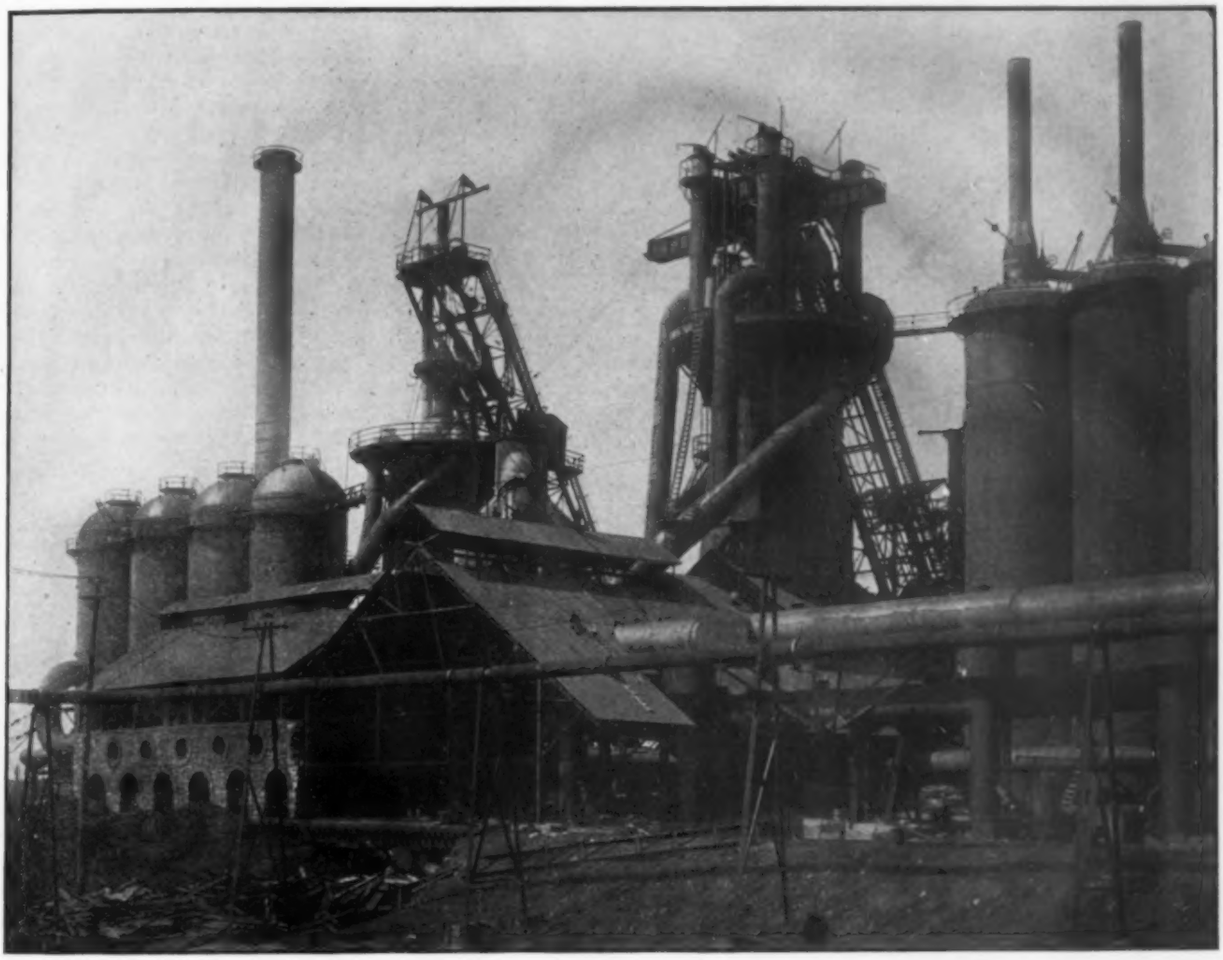


FIG. 1.—NEW BLAST FURNACE AT JOLIET PLANT OF THE ILLINOIS STEEL CO.

The blast furnace, which is known as No. 4, is built on the site of an old furnace which was torn down some time ago. It is 90 feet high from hearth to top, 22 feet diameter at the bosh and 15 feet 6 inches diameter at the hearth. The location is particularly fortunate, there being a rock formation 21 feet below the hearth, on which is built a brick and concrete foundation for the furnace.

The furnace is equipped with a Neumann distributor, and is served by a skip hoist of the double track deck type. The hoist is driven by two 75-horsepower electric motors. Either motor is sufficiently powerful to operate the skip, but in service both are used, they being geared to the winding drum of the hoist and running considerable under load. They are located underneath the bridge of the skip hoist, in the lower portion of what was originally the elevator house of the first furnace. The motors are controlled by Cutler-Hammer controllers, operated from the scale house.

The furnace presents a number of unusual features, chief among which may be mentioned the arrangement of bleeders and downcomers from the top of the furnace. Instead of the downcomers being taken directly from the tunnel head, as is the usual custom, four bleeders have been installed, which rise to a height of 35 feet from the top. The downcomers are taken off from these bleeders at right angles, at a distance somewhat over seven feet from the top of the furnace. These lead down to a dust catcher, 25 feet diameter by 56 feet high, entering the latter on a tangent. The object in this is to give the dust a whirling motion as it enters the dust catcher, and thus throw the greater quantity of the dust out by centrifugal force. The dust catcher is arranged on the interior, so that the dust is trapped and cannot be caught up again by the gas, as it leaves the dust catcher for the stoves. The idea in the installation of the bleeders with the downcomers taken off at a distance above the top was that considerably less dust would be carried off in the gas than if the downcomers were taken di-

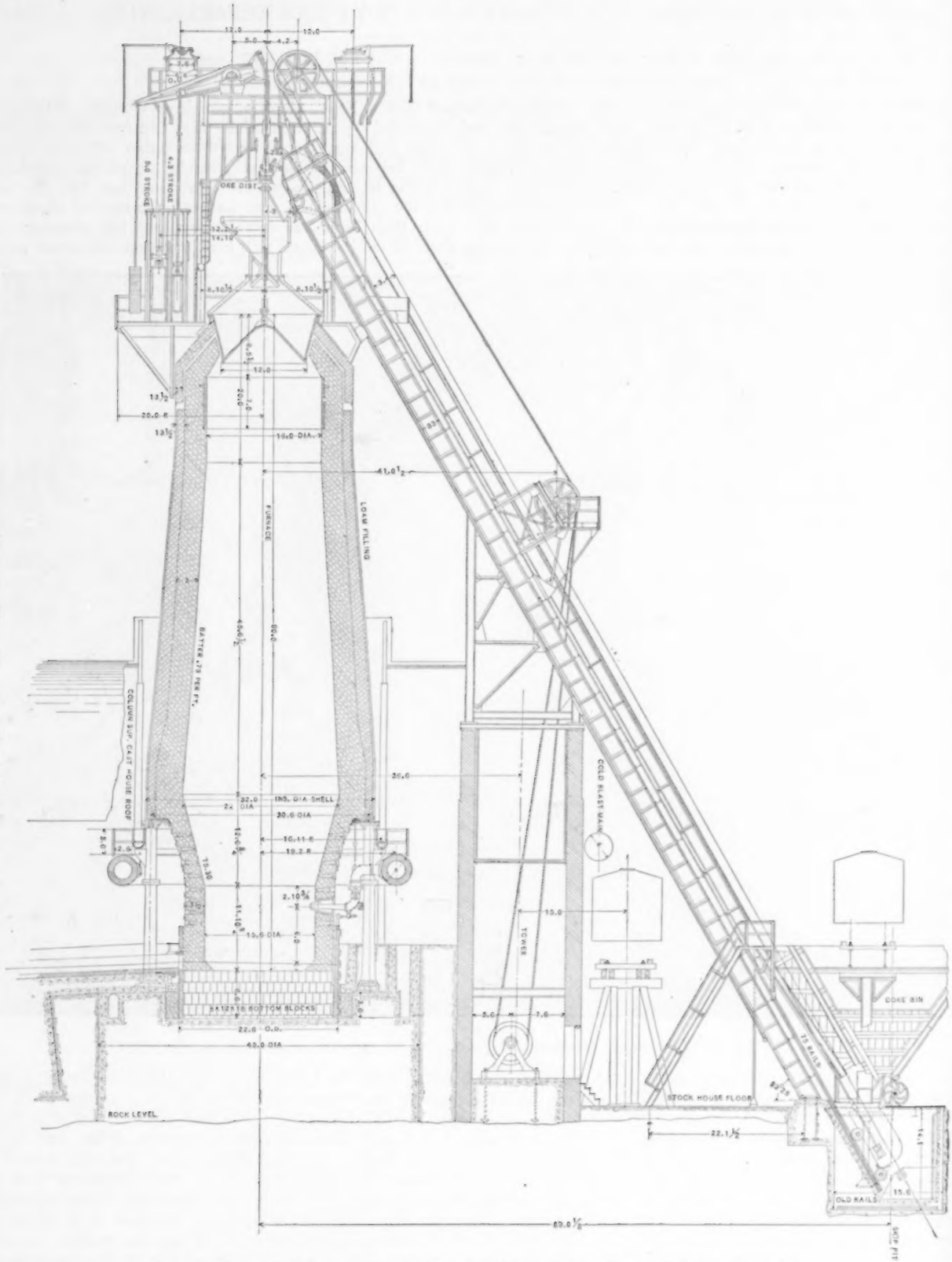


FIG. 2.—CROSS SECTION OF BLAST FURNACE NO. 4, JOLIET PLANT, ILLINOIS STEEL CO.

rectly from the top, especially when there is a slip in the furnace. The dust will be blown up into the bleeder, and in falling back would have to make a sharp turn to enter the downcomer. While a small portion of it may find its way into the downcomer, it will, for the most part, fall back into the furnace.

The bells, 12 feet and 4 feet 3 inches diameter, respectively, are operated by two steam cylinders controlled from the scale house at the foot of the skip hoist. The furnace presents an unusually massive appearance at the top, due largely to the construction installed to facilitate the removal of the bell and hopper. An arched structure has been erected on top, from which two girders are suspended, extending some distance outside the circumference of the top of the furnace. A trolley is suspended from these girders, by means of which the bell may be removed and carried to one side, while repairs are being made on the furnace. This trolley is operated by a hoisting engine at the ground level.

The bridge is supported by a tower in the middle, so that the furnace bears but one-fourth of the weight of the bridge. The stock house consists of a steel coke bin 37 feet by 27 feet in length, with a limestone pocket 90 feet by 30 feet between the coke bin and the furnace. The steel ore pockets, 120 feet by 45 feet, are situated a short distance beyond the coke bin, and under the same trestle; additional ore bins are provided under a parallel trestle. A separate trestle extends over the limestone pockets. The stock house floor is some 19 feet below the hearth of the furnace, while the bottom of the skip hoist pit is 14 feet below the stock house floor. The coke bins discharge directly into the buckets of the skip hoist, while limestone and ore are charged into it by means of ore buggies handled by laborers. The cross section of the furnace, Fig. 2, shows the relative positions of the limestone and coke bins of the furnace.

FIG. 4.—FURNACES IN BOLT DEPARTMENT.

Four stoves are used in connection with the new furnace, each stove being 25 feet diameter by 100 feet high, and having four passes. These stoves are situated to the left of the old furnace, shown in the illustration, Fig. 1, while the stoves alongside the new furnace in the same illustration serve the old furnace. This necessitates a peculiar arrangement of blast pipes, which is merely temporary, however, and will be done away with as soon as existing conditions are changed.

The new stoves are somewhat unusual in their construction, particularly at the base, in order to facilitate the removal of dust. The arrangement is shown in the illustration, Fig. 3. The base of the second and third passes forms a pyramid, the lower portions of which lead to discharge outlets with doors. The gas, passing through this section of the stove, discharges a large amount of dust on this surface, as it makes the sharp turn up to the third pass. The dust slides down the sloping surface, and is withdrawn from the stove through the dust outlet. A stack 10 feet diameter by 200 feet in height carries the waste gases from the stoves. The working platform is about 10 feet above the level of the base of the stoves, the manipulation of the valves thus not being interfered with by the removal of the dust from the stoves, the dust outlets discharging underneath the platform.

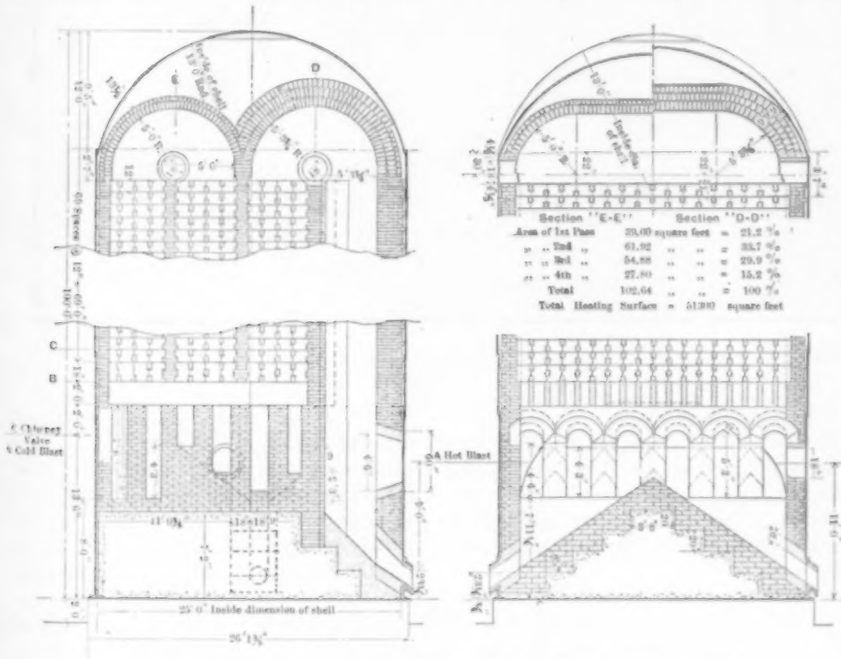

Section "E-E"
Section "D-D"
Area of 1st Pass 39.00 square feet = 21.2 %
" " 2nd " 61.92 " " = 33.7 %
" " 3rd " 54.88 " " = 29.9 %
" " 4th " 27.80 " " = 15.2 %
Total 183.64 " " = 100 %
Total Heating Surface = 51300 square feet
Hot Blast
Cold Blast
25'0" Inside dimension of shell
26'1½"

FIG. 3.—SECTIONAL ELEVATIONS OF NEW HOT BLAST STOVES.

The metal from the furnace is run directly into hot metal cars, and carried either to the Bessemer converters, or to the pig casting machine. Blast for the furnace is furnished by means of three Southwark horizontal cross-compound condensing blowing engines, each 44 and 84 by 84 by 60 inches. Steam for these is furnished by a battery of twelve 350-horsepower Rust boilers.

The Track-Bolt and Nut Department.

The track-bolt and nut shop is located in a steel frame, corrugated iron building, 500 feet long by 63 feet wide at one end, and 58 feet at the other. This construction was made necessary by the contour of the property, the

building being located along one of the property lines. It is divided, approximately, into two sections by an inspector's office and machine shop, in which the tools used in the manufacture of bolts and nuts are repaired. The arrangement of the building is as shown in the accompanying illustration, Fig. 6. The idea borne in mind in its design and construction was that there should be the shortest possible travel of stock from the raw material to the finished product. This was accomplished by building a comparatively long, narrow building, with the various groups of machines arranged side by side along the length of the building, the material passing transversely across it. Each group consists of a heating furnace, a bolt header and either a thread-rolling or thread-cutting machine. The arrangement of the group is such that the raw material is passed in through the wall on one side, placed in the furnace with a minimum of handling, formed in the bolt header standing immediately alongside the furnace and then threaded in the thread-rolling or thread-cutting machine, which is installed in a straight line with the header, at right angles to the long axis of the building. A pointer is installed alongside of each thread-rolling machine to chamfer the bolts before threading. The finished product is then sorted, placed in kegs and shipped from the opposite side of the building.

The arrangement of the nut department is much the same, the equipment being so arranged that the material passes in a straight line across the building, being shipped from the side opposite to that which it entered. The equipment of the bolt department comprises eleven bolt heading machines, together with their heating furnaces, six thread-rolling machines and twelve thread-cutting machines. The machines are arranged to make bolts from ½ inch to two inches diameter.

The heating furnaces are set on an angle to the axis of the building, as shown in the accompanying plan. The hearth of each furnace is three feet four inches by four feet six inches. They are unique in the respect that they are equipped with American underfeed stokers, and they are supplied with blast from a No. 10 fan. A flue extends underneath the furnaces throughout the length of the building, and conveys air to them from the fan. Each furnace is provided with an individual stack. A trolley extends the length of each department for the purpose of providing the stokers with coal. A coal storage bin is situated at either end of the building, having a capacity of 50 tons. Coal is discharged from this bin into a half-ton bucket on the trolley, which then distributes it to the stokers, as required.

The equipment of the nut department comprises eight nut machines with their furnaces, and 14 six-spindle nut tappers of ½ to two inches capacity, together with one machine for small size nuts. Lubricating mixture is supplied to the tapping machines by a gravity system, there being a main supply tank located under the roof of the building. From this tank pipes are led to each spindle of the various machines. After use, the liquid runs into a gutter, extending the length of the room under the floor, from whence it is pumped through a filter to the supply tank to be used over again.

All the machines in both departments are driven by belt from line shafts, the arrangement being as shown in the two cross sections of the building. Motive power is furnished by a 75-horsepower motor and a 50-horsepower motor in the bolt department, driving the bolt head-

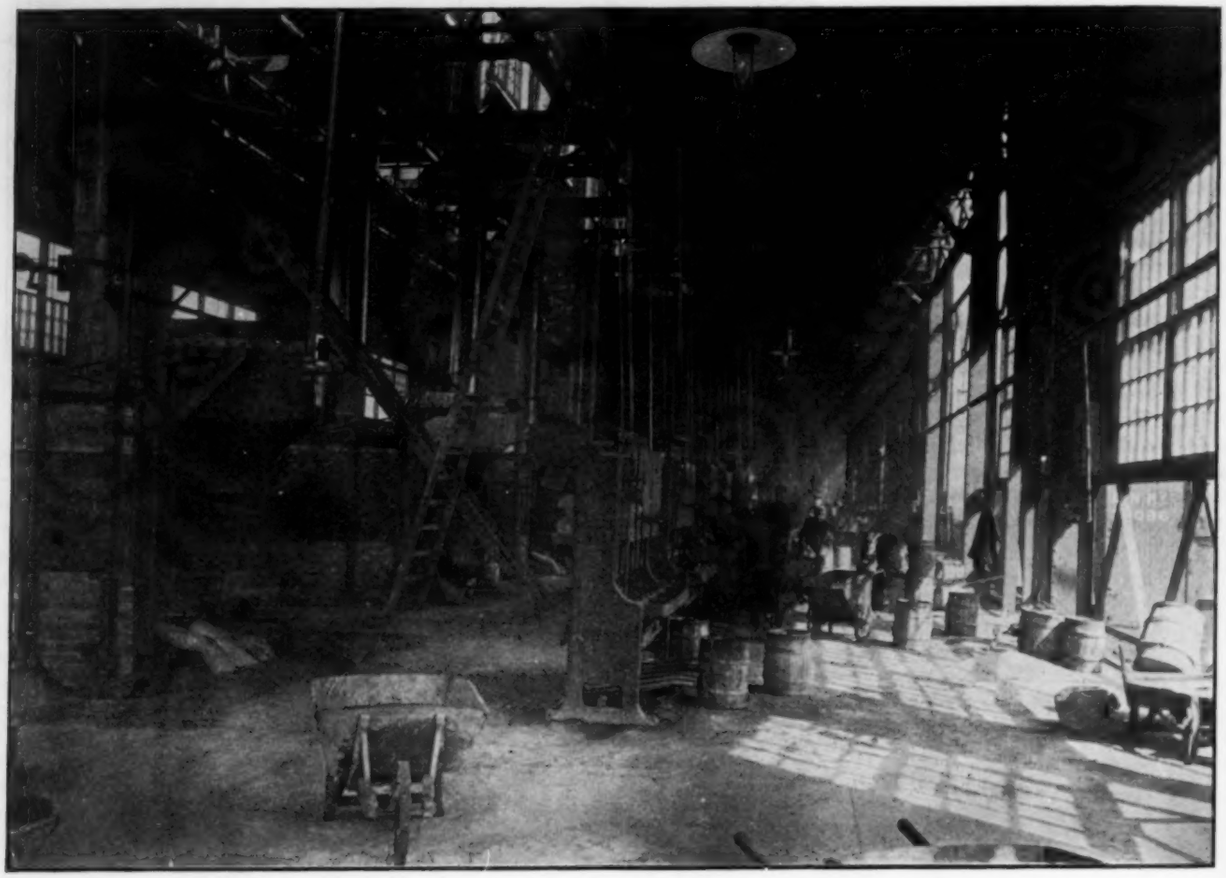


FIG. 5.—INTERIOR OF NUT DEPARTMENT, SHOWING FURNACES AND TAPPERS.

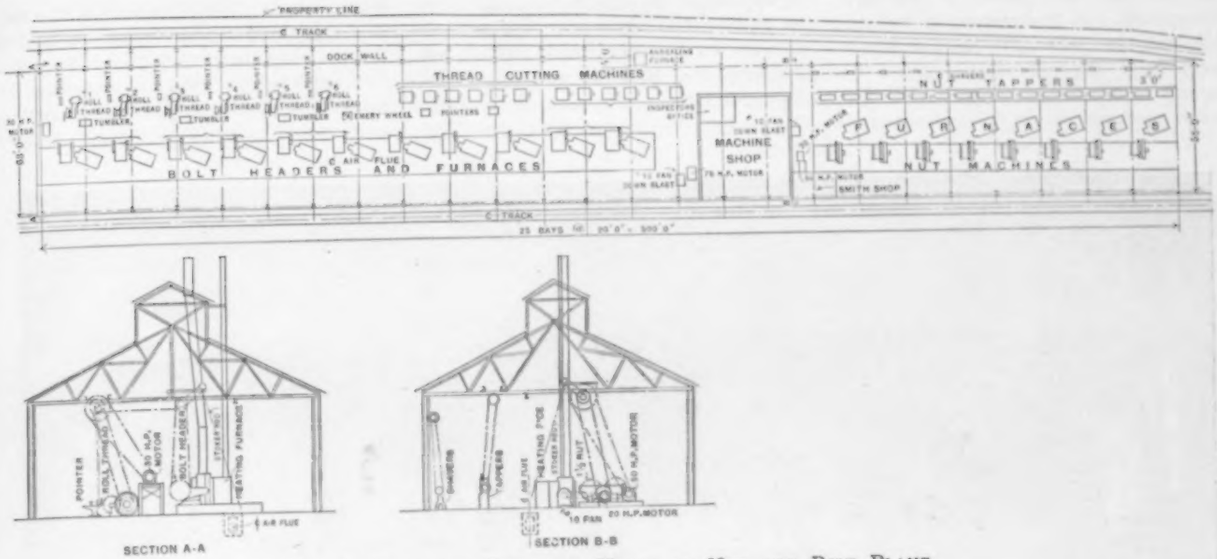


FIG. 6.—PLAN AND SECTIONAL VIEWS OF NUT AND BOLT PLANT.

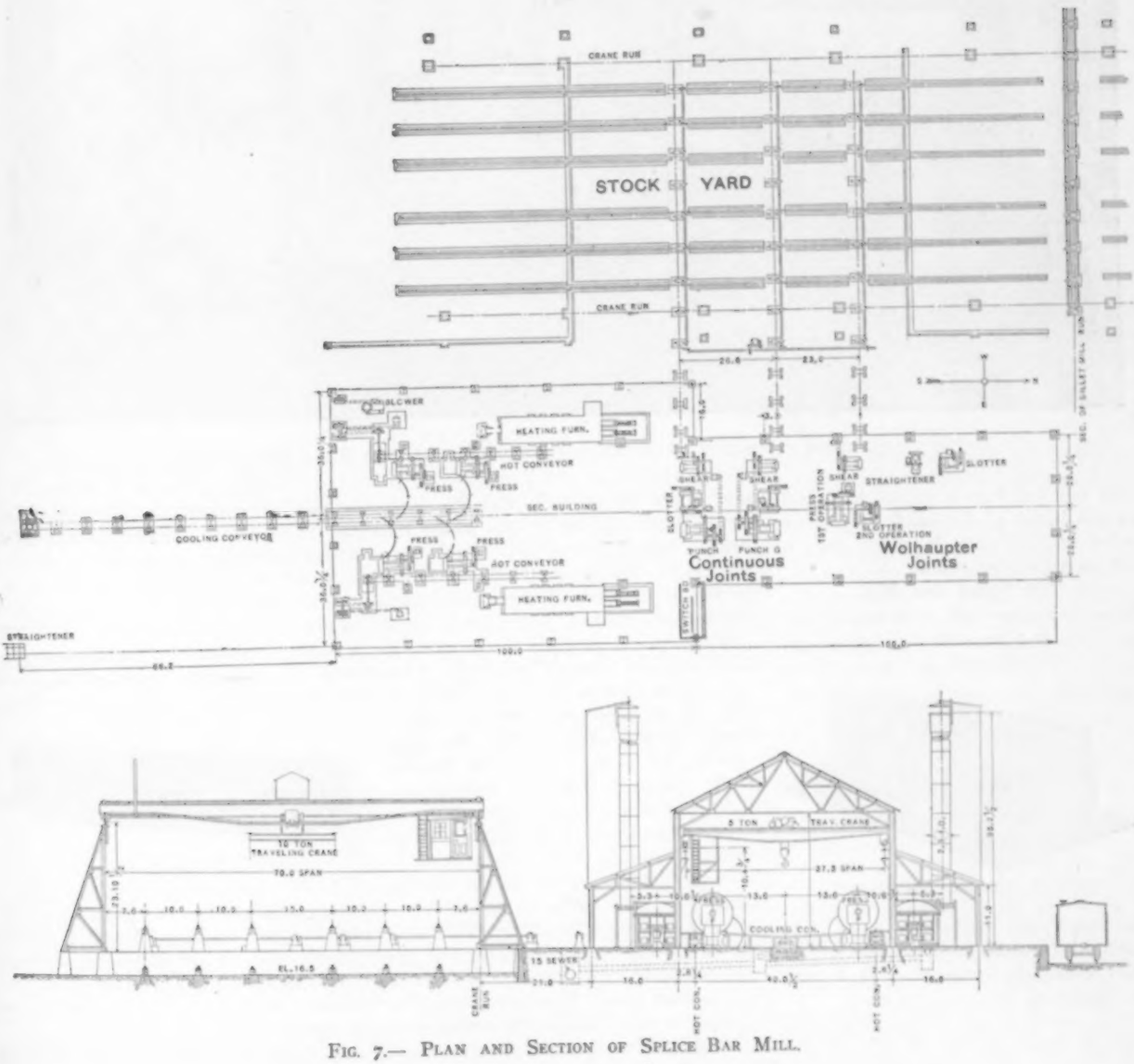


FIG. 7.— PLAN AND SECTION OF SPLICE BAR MILL.

ing machines and threading machines, respectively. A 75-horsepower and two 20-horsepower motors in the nut department drive the nut machines and nut tappers and shavers, respectively. The stoker mechanisms are driven by a crank shaft and rod from a line shaft, extending the length of the building. The capacity of the plant is 20,000 kegs of bolts and nuts per month.

FIG. 7.—INTERIOR OF SPLICE BAR MILL, SHOWING WALHAUPTER JOINT DEPARTMENT.

The Splice Bar Mill.

The splice bar mill comprises a storage yard and the mill building proper. In the mill are made rail joints of the Continuous and Wolhaupter types. The manufacture of these two joints will be more thoroughly understood if a brief description of them is first given.

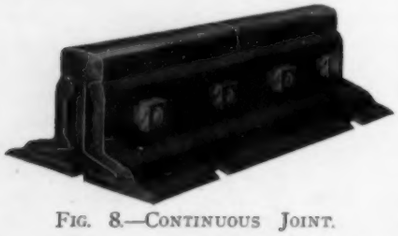


FIG. 8.—CONTINUOUS JOINT.

The construction of the Continuous joint is shown in Fig. 8. It consists of two pieces of a form somewhat similar to the usual angle plate, but with the addition of a flange which extends underneath the base of the rail. This flange and the upper part of the angle fit closely to the base of the rail and support it. It is necessary that the angle of the joint conform to that of the rail flange, otherwise there will be side play of the rail. The Wolhaupter joint shown in Fig. 9 is somewhat similar, with the exception that a base plate is used, and that the angle plate is cut away at the ends and extends under the plate only at its middle portion. The base plate is of corrugated section, with a flange on one edge, against which the rail bears. It is notched on the opposite edge, in order to accommodate the flange at the middle of the joint.

The Continuous joints are made from a rolled section, whose shape can be seen in the illustration of the storage yard, Fig. 10. As these sections come from the rolling mill, the angle between the flange and the upper portion of the bar is considerably wider than it is in the finished joint. This is necessary, on account of conditions in the rolling mill, as it would be extremely difficult, if not impossible, to roll a section with the narrow angle which obtains in the finished joint. The operations in the manufacture of the joint consist in shearing the proper length from the rolled section, as it comes from the rolling mill, located in another part of the plant, notching and punching the sheared joint, heating it and squeezing the joint, so that the angle is closed to the proper size and shape. The storage yard is 450 feet long by 75 feet wide, and is spanned by a 10-ton crane built by the Alliance Machine Co., Alliance, O. Extending across the yard at right angles to the crane runways are three conveyors for carrying the long lengths of rolled section into the mill. These are driven through bevel gears from an electric motor, located at the middle point at one side of the yard.

FIG. 9.—WOLHAUPTER JOINT.

The mill comprises a main building

100 feet long, 40 feet wide, with two lean-tos 16 by 100 feet at the south end, containing the two heating furnaces. The main building is provided with a five-ton traveling crane, built by the Whiting Foundry Equipment Co., serving the presses, etc. In the main building are located the presses for shearing, notching and punching the section. These are located in groups of three, the three machines in each group standing immediately alongside of one another, and the piece passing successively through each. The first operation is to shear the joint to length from the long rolled section.

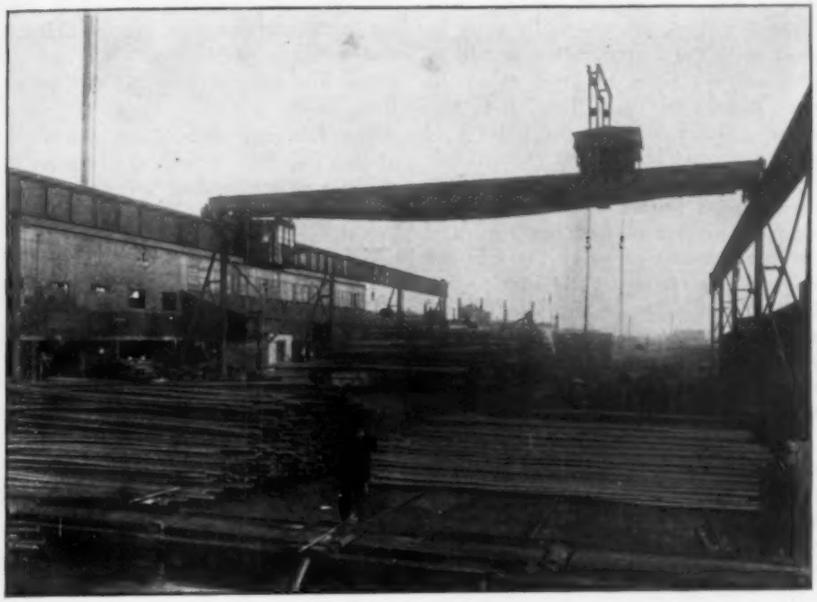


FIG. 10.—STORAGE YARD OF RAIL JOINT PLANT.

The sheared piece then passes to the second press, where the spike notches are cut. The third press punches the holes for the track bolts. This work is all done cold, and on its completion, the sections are carried by laborers to one of the heating furnaces located in the lean-tos. There are two of these located opposite each other and along either wall of the building. They are the continuous type, 28 feet long by 7 feet wide. Coal is used for fuel, the grate surfaces being three feet nine inches by 5 feet two inches. Hydraulic pushers on the outside cause the joints to move through the furnace to a point where they can be taken out through a door in the side. They are then placed on a hot conveyor and are carried to a press, in which they are squeezed to such form that they will enclose the base of the rail snugly. There are four of these presses, two for each furnace, located as shown in the accompanying plan. When squeezed, they are placed on a cooling conveyor about 100 feet long. After being taken from this conveyor, they are inspected and piled up in the yard while awaiting shipment.

In the manufacture of the Wolhaupter joint, the operation is somewhat different. The work is done in the group of machines located to the north of the two groups in which the continuous joints are made. The first portion of the manufacture of this joint is the same as that of the continuous type. After being punched, however, instead of going to the heating furnaces, they are carried to two presses, located as shown in the plan of the building, and the piece is cut from the base of the joint in two operations. As a different section is used, and as it is not necessary for this type of joint to fit the rail so closely as the Continuous form, it is not necessary to crimp the joint. After the pieces are cut out from the base, the joints are straightened and then are ready for shipment. The base plates are cut from rolled sections and notched for the angle plate and punched for the spikes in the same building.

All the tools in the plant are driven by individual electric motors. In most cases the motors are geared direct to the machines, though in a few instances they are belted. The tools used in this work are simply standard punch presses of heavy design, no special machinery being needed; the only special work required are the dies, which are changed for each form and weight of joint.

The heating furnaces are provided with blast by means of a motor-driven blower, located in one corner of the building. Air is delivered into the ash pit. Under the ash pit is a pan, extending crosswise through the furnace. This is filled with water, and forms a water-seal. The ashes are removed from this pan, without disturbing the continuous operation of the furnace. The capacity of the plant is 14,000 tons of joints per month.

INCREASES ARE FEW

In British Prices of Late. — Labor Difficulties are Menacing.

Birmingham, Eng., Nov. 2.—My last letter, written on the eve of the quarterly meeting, anticipated a strong market, which was fully realized. At the same time there was a notable absence of anything like a boom, and there were few increases. The ports were well represented, and there was a great attendance of tin-platers. The makers report a recovery of buying in Russia, where the oil trade has revived, and there are better demands from Canada, the States and Australia. Prices are about a shilling a box more than three months ago and all the mills are full of work until the end of the year. In view of the high prices of tin a meeting of the Tin Sheet Association, presided over by Mr. Stanley Baldwin, a director of Baldwin's, Ltd., decided to raise the price of tinned sheets £2 per ton, making coke £31 and charcoal £33.

An important increase is that just declared in iron and mild steel wire, which is now raised to £10 10s. This makes the second advance, totaling £1 15s in a fortnight. The rise is due to the extraordinary demand, especially for nails and screws. An increase of marked bars by 10s a ton was suggested, and seriously considered, but the makers decided against the proposal, largely, it is said, because of the excellent trade the lower price enables an influential maker to do in Australia.

With regard to steel, it is remarkable that the strike on the Clyde has apparently made no difference to the demand for metal, so that prices more than maintain their strength. This is thought to be largely due to the great consumption for building requirements.

There was an interesting reference to steel at the meeting of Baldwin's, Ltd., on Monday last. This firm made a profit of £110,000 for the year, and a net profit of £56,248, out of which it applied £30,000 to reserve, paying a dividend of 2½ per cent.

This firm has entered into an arrangement with the Gloucester Railway Carriage & Wagon Co. for the joint purchase of the Port Talbot Steel Co.'s works, a transaction which it is believed will benefit both companies.

Workmen Ask Advance.

We are in the thick of wage trouble in the Birmingham district, 10,000 work-

men connected with the Engineering & Allied Trades having put forward a claim for 2s a week advance. The movement covers the whole of the Black Country, but the result of a conference is a blank refusal of the advance by the employers. The men are threatening a strike, but it is doubtful at present whether the threat will be carried out. We have some immense foundries in this district which would be affected by a stoppage, and at present practically all are very busy. One of the most successful companies in the district is the Conveyer Co., Ltd., of Smethwick, a firm consuming a great amount of steel, in the manufacture of conveyor buckets, which are used to carry coal mechanically to boiler furnaces. The firm has just introduced a very fine equipment to the Birmingham electric station at Summer Lane.

Mr. Ernest Farnworth, of Wolverhampton, late manager of the Corrugated Iron Works, left a fortune of £50,812. Mr. Farnworth, who died Aug. 17, was a well-known Black Country figure, and a member of the Iron & Steel Institute. Mr. Joseph Highfield Jones, of Rosslyn, ironmaster, is one of the executives.

One of our great captains of industry, Sir Richard Tangye, a founder of the great firm of Tangyes, Ltd., has just passed away at a ripe old age. The story of the founding of this firm is well known, he and his brother commencing practically without capital in a small room in Birmingham. The upward climb commenced when Sir Richard and his brother were able to supply hydraulic lifts of sufficient strength to launch the Great Eastern. For many years past Sir Richard has withdrawn from active participation in the business. It is believed that his gifts totaled as much as a quarter of a million.

The Premier Gas Engine Co., of Sandiacre, near Nottingham, has received an order from Messrs. Alfred Hickman, Ltd., Spring Vale furnaces, and Staffordshire Steel & Ingot Ironworks, Bilston, for what is believed the largest gas blowing engine in existence. It is certainly the largest in the United Kingdom, having a capacity of 40,000 cubic feet of free air per minute. It is to run on blast furnace gas.

There has been a marked increase of activity at the works of Messrs. Armstrong, both at Elswick and Scotwood, and many suspended workmen are being daily restarted. An important contract for their ordnance department is about to be concluded.

Messrs. Frank Lloyd & Co., of James Bridge, Darlaston, one of our largest steel founders, are finding it necessary to build new shopping and increase their plant. The firm is doing a very good trade in tramway points, and various forge requisites.

IRON AND STEEL FOREIGN TRADE INCREASES.

Exports of iron and steel manufactures show an increase of about 25 per cent in the nine months ending with September, and imports of iron and steel manufacturers show also an increase of practically 25 per cent in the same period, when compared with the corresponding months of the preceding year. Exports of all domestic products increased meantime but about 13 per cent and the total imports but about 9 per cent.

A remarkable feature of the import movements in this class is that of pig iron and iron ore. Importations of pig iron in the nine months ending with September, 1906, are practically twice as great as in the corresponding months of 1905 and six times as great as in the same months of 1904. Iron ore also shows a large increase, the imports of that commodity in the nine months ending with September, 1906, being 818,030 tons, against 650,286 tons in the corresponding months of 1905 and 297,212 in the same months of 1904. Pig iron and iron ore imports aggregated over 10 million dollars' value in the nine months ending with September, 1906, against about 5 millions, in the corresponding months of 1905 and about 2 millions in the same months of 1904.

Nearly all forms of iron and steel show an increase in importations, the principal exception to this being tin plate, which shows a fall from $3,381,150 in the nine months ending with September, 1905, to $2,526,632 in the corresponding months of 1906.

Another article of importation which may be considered as a measure of activity in certain lines of iron and steel manufacturing is pig tin, used chiefly in manufacturing tin plate, of which the importations in 1906 amount to over $27,331,500, against $20,700,371 in the corresponding months of 1905 and $17,348,294 in the same months of 1904. Exportations of tin plate also show a marked increase, the total number of pounds exported in the nine months ending with September, 1906, being 23,794,151, against 14,562,152 in the corresponding months of 1905 and 12,056,069 in the same months of 1904.

The growth in exportations of iron and steel, a growth which has been one of the most marked characteristics of the export trade during the last decade, is larger in the nine months ending with September, 1906, than in any corresponding period in the history of our export trade.

Pig iron is, at the present time, the most striking feature of the iron and steel imports, having been $7,801,664 in the nine months ending with September, 1906, against $3,788,376 in the corresponding months of 1905 and $1,337,548 in the same months of 1904. This pig iron comes chiefly from the United Kingdom. The total value of pig iron imported in the fiscal year 1906 was $7,788,884, of which $5,376,983 was from the United Kingdom, $903,908 from Germany, and most of the remainder from Austria-Hungary, Belgium, France, Sweden, and Switzerland.

Iron ore is also an import of considerable importance, though the figures are not included in those above quoted of the value of iron and steel importations. The value of iron ore imported in the nine months ending with September, 1906, is $2,295,506, against $1,514,291 in the corresponding months of 1905, and $685,123 in the same months of 1904. The bulk of this iron ore comes from Cuba.

The following table shows the value of iron and steel imports and exports in the nine months ending with September, from 1896 to 1906:

	Imports.	Exports.
1896	$16,361,429	$ 34,549,290
1897	10,829,797	45,693,384
1898	9,639,658	59,990,665
1899	10,768,407	76,569,205
1900	16,398,349	97,311,140
1901	14,057,766	76,846,899
1902	27,838,237	73,352,016
1903	34,652,234	72,714,360
1904	16,598,505	92,551,937
1905	19,565,755	102,922,277
1906	24,376,887	127,189,673

THE IRON AND STEEL PRODUCTION OF ITALY FOR 1905.

The statistics of iron and steel production in Italy for 1905 are now available. The total output of iron ore was 366,616 tons, the average metallic content being 52 per cent. Manganese ore was produced to the amount of 5,384 tons, varying from 15 to 45 per cent of manganese. The production of pig iron during the year was 143,079 tons, and the output of blast furnace castings was 38,169 tons. Of finished iron, 205,915 tons were produced, and of steel of all kinds, the production amounted to 244,793 tons. This was subdivided as follows: bars and profiles, 147,225 tons; rails, 34,568 tons; castings and forgings, 29,299 tons; tubes, 4,000 tons. The pig iron producing plants of Italy are four in number, of which two with three blast furnaces, are in the district of Florence, and two, with five furnaces, in the district of Milan. The steel works plants comprise two Bessemer and two Roberts converters and 42 open-hearth furnaces.

FOUNDRY MIXTURES.[1]

By Bradley Stoughton.

The two important points of difference between iron castings and steel castings are, (1) that the former have about three to four per cent of carbon, while the latter have usually less than one per cent, and (2) that the cast iron has

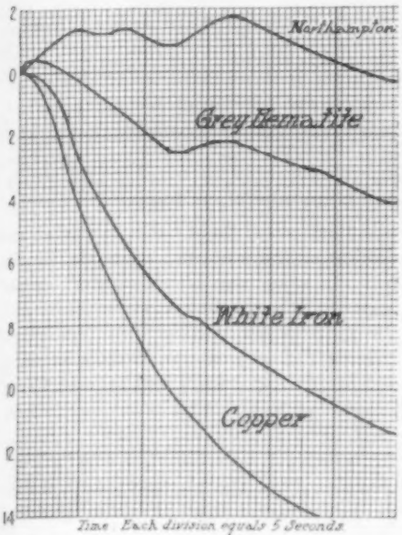


Fig. 1.—Cooling Curves.

about ten times as much silicon as the steel. The advantages of cast iron, and the reasons it is so extensively used are its fluidity, low shrinkage, relative freedom from checks and the ease with which we can at will confer different properties upon it. The advantages of steel are its strength and its ductility.

The amount of combined carbon in the cast iron and in the steel varies between practically the same limits, but cast iron contains, in addition, 2.5 to three per cent of graphite, and one to two per cent or so of silicon. From this standpoint cast iron may be considered as high silicon steel mechanically mixed with crystals of graphite, and many of its properties are logically explained upon this basis.

Shrinkage.

One of the most striking illustrations of this principle is in the shrinkage of iron castings, which averages about one-half that of steel.[1] The difference is due to the expansion caused by the graphite, which separates out of the iron and pushes aside the particles of metal, during and immediately after solidification. After this, the metal contracts like steel, but the preliminary expansion has been such that the ultimate shrinkage is only about one-half what it otherwise would have been. We can thus control this shrinkage by controlling the amount of the expansion, through varying the graphite. This point will be more readily understood by referring to Fig. 1, which is taken from a recent article by Professor Thomas Turner, of England.[2]

Explanation of Fig. 1.

The point o marks the position occupied by the end of the bars at the moment of solidification. It will be seen that in the case of copper, the metal contracts continuously from this point, as shown by the continuous drop of the curve. In the case of white iron the metal contracts continuously until we reach a certain point (which is at a temperature of about 665 degrees Cent.) when a momentary arrest of the shrinkage takes place, after which the metal again contracts. This arrest is common to all cast iron and steel and is not related to graphite. Now, see what a difference there is in the case of gray hematite cast iron, which does not shrink immediately after freezing, but expands very appreciably, as shown by the rise in the curve. This expansion is due to the graphite that is being expelled from the metal and occupies space between the particles of iron. Again, in the case of the Northampton iron, which is high in both silicon and phosphorus, the expansion is very long continued, and the metal cools to a temperature of almost a black heat before the bar has shrunk again to the size it had when first cast. This expansion is again due to the

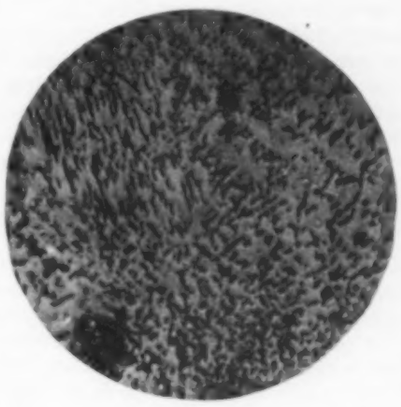


Fig. 3.—Phosphorus Eutectic in Cast Iron.
Magnification, 1,000 diameters.

separation of carbon, and is assisted, apparently, by the phosphorus keeping the iron in a semi-fluid condition for a long time and thus allowing the graphite more easily to separate and make place for itself. Here, too, we have an explanation why phosphoriferous irons fill every crevice of the molds so perfectly. Being in a pasty condition for some time, and continually expanding, the semi-fluid metal is forced into the tiniest crevices of the molds, filling all the corners with astonishing sharpness.

These explanations show why the shrinkage of the casting increases with the amount of the sulphur and the speed of the cooling (which reduce graphite), and decreases with the amount of silicon, which increases graphite.

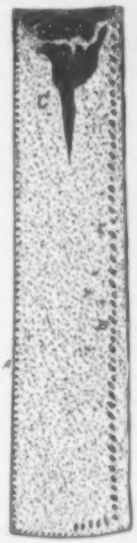


Fig. 2.—Blow Holes and Construction Cavity or "Pipe" in Steel Casting.

Porosity.

The maximum density of cast iron occurs with one per cent of silicon. With more than that too much graphite separates, causing the crystals of the metal to be large and separated from each other by flakes of graphite, so that the grain is open, and water, under heavy pressure, might leak out (for example, in the case of hydraulic cylinders, etc.) Above two per cent of silicon, the grain of the iron becomes so open as to be actually porous, and the density falls off twelve per cent. With less than one per cent silicon the cast iron will contain spongy spots or blow holes. These spongy spots are due to high shrinkage on account of low graphite.[3]

To make a close grained iron for hydraulic work, the sulphur should be from 0.03 per cent to 0.055 per cent. If more than this, the iron is liable to be dirty, to contain spongy spots, on account of low graphite, to be difficult to machine, on account of high combined carbon, and to be weak, because sulphur, aside from its effect on carbon, greatly reduces the strength of iron as well as steel. Especially, if the phosphorus is high, the sulphur must be kept down to these limits or the iron will be hard and brittle, because phosphorus and sulphur working against each other, one increasing and the other decreasing shrinkage, make brittle iron.

[1] Paper read before the Pittsburg Foundrymen's Association, Nov. 5, 1906.

[2] *Journal of the Iron and Steel Institute.* No. I, 1906. Page 57.

[3] In the case of steel, where there is no graphite, these spongy spots actually become large open cavities, or "pipes." See Fig. 2.

Cast iron for the same use, should contain from 0.4 per cent to 0.6 per cent of manganese. We do not want more manganese than this or the casting will be difficult to machine. We do not want less than I have indicated because manganese assists greatly in counteracting the bad effects of sulphur and phosphorus.

Phosphorus has a double-acting influence on the porosity of cast iron: (1) It increases the size of the crystals, decreases shrinkage, and causes a large expansion after solidification, as explained in connection with Fig. 1, but, (2) it fills all the crevices between the crystals and in the interior of the iron, which, by decreasing the porosity, counteracts its first influence. When the phosphorus is high the phosphorus and iron form a combination known as a eutectic, which remains fluid for a long time and fills the tiniest crevices in the interior of the metal. For this reason iron for hydraulic work may run up to 0.7 per cent phosphorus, but above that the iron is liable to be weak and "cold-short," especially under impact. In fact, where very strong iron is desired, the phosphorus should be kept down to 0.4 per cent at least.

With the various amounts of impurities mentioned above, the combined carbon will be in the neighborhood of one per cent and the graphite about 2.5 per cent, the exact amounts depending upon the thickness of the castings and the rate at which they are cooled. If we desire to keep the combined carbon the same and reduce the graphite, it will be necessary to reduce the total carbon. This can be accomplished by mixing in steel scrap and melting fast in the cupola, or by melting in an air furnace instead of a cupola. This reduction in graphite results in a closing of the grain of the steel, with consequent increase in strength and density.

FIG. 5.—LINES OF WEAKNESS DUE TO CRYSTALLIZATION.

A common cause of porosity in castings is segregation, or collection together of impurities in spots. This segregation is the greater the greater the amounts of phosphorus, sulphur, manganese and silicon. Phosphorus increases the segregation by making a fluid eutectic, which does not solidify until after the remainder of the casting, but then runs into that part of the metal having the loosest texture. This part is usually in the middle of the larger sections of the casting and when the silicon is high, and there are shrinkage spots, the segregation will be excessive in the neighborhood of these spots. Manganese and sulphur are also liable to collect in the same way and place. These localities, where the segregation is high, known, when very bad, as "hot spots," are sometimes porous or surrounded by porous parts of the casting. They are sometimes so extremely hard that no tool will cut them. One way of getting rid of them is to use very large risers, or headers, which solidify last and serve as feeders for the remainder of the metal. Under these circumstances, the segregation occurs in the riser and is thus temporarily removed. This method is not advisable as a regular practice, however, because these risers ultimately find their way back into the cupola as scrap and result in increasing the impurities in a subsequent set of castings.

FIG. 4.—CRYSTALS OF THE DOUBLE CARBIDE OF MANGANESE AND CARBON $(Fe\ Mn)_3\ C$.
Magnification, 50 diameters.

Headers themselves increase the density of iron castings by feeding the metal and so preventing the porous spots, and also by keeping the metal under a pressure during solidification. This latter is especially serviceable when the phosphorus is high, which tends to make the metal expand during solidification, as I have shown.

Softness, Workability and Strength.

It is the combined carbon which is the great hardener of cast iron, the other elements producing hardness chiefly in proportion as they produce combined carbon, except manganese, which not only produces combined carbon, but also produces a compound having the formula, $(FeMn)_3C$, which is very hard and difficult to machine.

Silicon, by decreasing combined carbon, decreases hardness. When we get above three per cent silicon, however, there begin to form new compounds with silicon which make the iron hard. Furthermore, silicon above three per cent increases combined carbon, instead of decreasing it.

The maximum softness of cast iron is obtained with about 2.5 to three per cent of silicon, the sulphur being not above 0.1 per cent and the manganese not above 0.4 per cent. In large or slowly cooled castings, the silicon should be near the lower limit, and in small or rapidly cooled castings, near the upper limit, in order that the combined carbon may be down below 0.15 per cent and the graphite more than three per cent. Such a cast iron would correspond to a soft steel, mechanically mixed with crystals of graphite. This soft steel would machine with great ease, and the graphite would act as a lubricant for the cutting tool. The mixture will have a transverse strength of about 2,000 to 2,200 pounds, be low in density and open in grain. To increase the strength without increasing the hardness, the best way is to cut the sulphur and phosphorus down to a low point, if possible, because sulphur, and next to it phosphorus, are the impurities which weaken iron most (aside from their influence on carbon). Another way is to decrease the total carbon, and hence the graphite, because graphite crystals, especially if large, are great weakeners of cast iron.

FIG. 6.—LOW CARBON STEEL CONSISTING OF PEARLITE SURROUNDED BY CARBONLESS IRON. THIS STEEL IS EASY TO MACHINE.

The strength of steel is more than double the strength of cast iron, the

difference being due altogether to the graphite in cast iron, because silicon in itself (aside from its influence on the carbon) is a strengthener of both iron and steel up to at least four per cent. The way in which the graphite destroys the strength is well known to all, the broad plates of the metalloid forming planes of weakness in the casting, which easily break asunder, the graphite splitting in two, just as flakes of mica break apart, leaving one-half of each crystal of graphite sticking to each side of the fracture. This action can be proven by anyone to his satisfaction by taking a fracture of open gray iron and brushing one side of it for several minutes with a stiff brush. In this way the half plates of graphite will be brushed off, leaving a surface underneath almost of the color of white iron.

The total carbon may be reduced by melting steel scrap with the iron, or, to a slight extent, by decreasing the amount of manganese, provided that the manganese left must always be at least twice the sulphur, or the iron will be weak and brittle.

The strength of cast iron may be increased by increasing the combined carbon, but this is done at the expense of softness and workability. Cast iron containing from 1.5 to two per cent of silicon (depending upon the size of the castings and rate of cooling), 0.9 per cent of combined carbon, 0.5 per cent of manganese and not more than 0.08 per cent of sulphur and 0.3 per cent of phosphorus, will work without difficulty in the machine shop and have a tensile

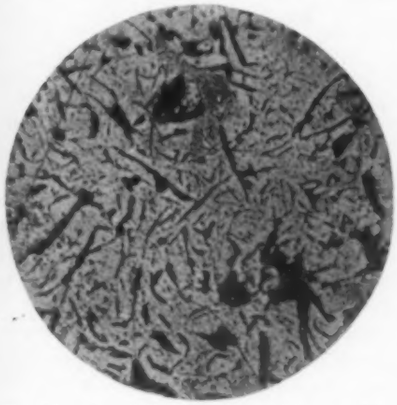


FIG. 8.—GRAY CAST IRON. Si, 1.75 PER CENT; S, 0.025 PER CENT.
Magnification, 50 diameters.

strength of over 28,000 pounds per square inch. In many cases foundries are unwilling to go to the expense of such a low sulphur and phosphorus. In this case the strength must be obtained by raising the manganese, which is not advisable, as it decreases the softness more than any other element, causes dull iron and high total carbon.

An important point in connection with the strength of cast iron is the size of the crystals of graphite—the smaller these crystals are the greater the strength, because the smaller are the planes of easy rupture. A notable example of this is malleable cast iron, which may have a tensile strength of 45,000 pounds per square inch, even when

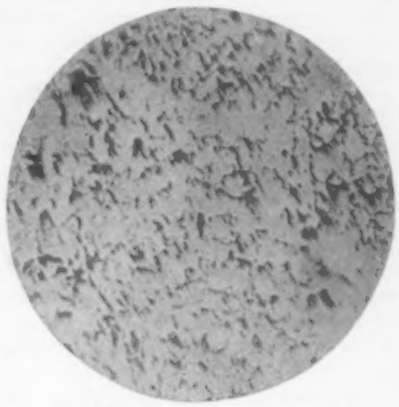


FIG. 7.—MALLEABLE CAST IRON SHOWING THE SMALL SIZE OF THE GRAPHITE CRYSTALS.
Magnification, 50 diameters.

the percentage of graphitic, or temper carbon is as high as three per cent. The very small size of the flakes of the temper carbon does not reduce the strength as much as the same amount of the larger graphite crystals.

One way to make the graphite crystals small is by mixing different brands of iron in the cupola. Why this should produce smaller crystals than when only one brand is melted is unknown to me, but does not change the fact, which explains why it is considered advantageous to mix brands for foundry work.

To obtain high transverse strength, the silicon should be about 0.2 per cent lower and the combined carbon about 0.2 per cent higher than the figures given for tensile strength. Otherwise the effects are very similar.

Sulphur and Manganese.

Sulphur and manganese both increase combined carbon. It is important to note, however, that sulphur and manganese form a compound with each other, having the formula MnS, and to this extent they neutralize each other and neither has so great an effect on the carbon. To form the compound mentioned, about two parts of manganese unite with one part of sulphur. If, therefore, we have just twice as much manganese as sulphur in our castings, these two elements are all used up in neutralizing each other and neither of them acts so powerfully upon the carbon. It is only the excess of one or the other over the amount necessary to form the MnS which has the full effect.

The compound, MnS, is of great importance in foundry metallurgy, and explains many things that have troubled foundrymen for some time. If there is more sulphur than one-half of the manganese, the excess goes to form a sulphide of iron, and this sulphide of iron is very harmful in castings, greatly reducing strength and producing checks, as well as "red-shortness" and "cold-shortness." It is, therefore, of great importance that there should be at least twice as much manganese as sulphur. The sulphide of manganese is itself bad for castings, but the sulphide of iron is very much worse. In this connection it is important to notice that iron takes up about 0.35 per cent of sulphur in the cupola and loses about 0.1 per cent of manganese, or more if the manganese is obtained by melting spiegeleisen or ferro-manganese with the iron, so these allowances must be made in calculating the foundry mixtures.

Checking.

The time when a casting usually checks is when it is just above black heat. It is then in a weak condition, and, as shown by Fig. 1, is crushing the sand severely. Sulphur greatly increases weakness at this temperature, because both sulphide of manganese and sulphide of iron are now in a pasty condition, and, therefore, offer very little resistance to breaking. The sulphide of iron is much worse, however, because this is spread out in thin plates or membranes which offer much more extended planes of weakness than the sulphide of manganese, which is in small spots or bubbles, resembling blowholes in its effect.

FIG. 9.—GRAY CAST IRON COOLED VERY SLOWLY, SHOWING THE VERY LARGE SIZE OF GRAPHITE CRYSTALS.
Magnification, 50 diameters.

Phosphorus, by decreasing shrinkage, decreases the liability of checking, but phosphorus has another influence and that is the production of large sized crystals, and in this respect it increases the liability of the metal to check. An excess of manganese over twice the sulphur will, however, neutralize to a certain extent, the influence of phos-

phorus in producing large sized crystals, and will thus reduce checking.

The reason why checking is so liable to take place at the sharp corners is shown by Fig. 5, which is an exaggerated case of large sized crystals, but shows how these crystals join together at corners and make a junction line of weakness along which rupture may easily take place. The size of the crystals can be decreased to some extent by chilling the sharp corners and by feeding them well. Feeding all localities liable to check has the double advantage of preventing shrinkage and segregation, both of which increase the liability of checking.

Comparison of a Good and a Bad Wheel.

An interesting practical test of these explanations of the properties of cast iron was given by Mr. Asa W. Whitney in the comparison of the two wheels having the composition shown below in Table I.[4]

FIG. 10.—WHITE CAST IRON. Si, 0.75 PER CENT; S, 0.120 PER CENT. Magnification, 50 diameters.

TABLE I.
Good wheel required 150 blows of 25 pound sledge to break it.
Poor wheel required 8 blows of 25 pound sledge to break it.

	Fe.	Total Carbon.	Si.	Mn.	P.	S.	Graphite.	C. C.
Good Wheel	94.79	3.84	0.69	0.13	0.43	0.12	3.30	0.54
Poor wheel	95.00	3.52	0.65	0.12	0.52	0.19	2.35	1.17

It will be seen that the analysis of the poor wheel does not differ enough from that of the good wheel to explain the cause of its weakness nor of the high combined carbon. Mr. Whitney figured out the the chemical compounds present, as given in Table II, and this shows at a glance the cause of the trouble. Notice the large amount of sulphide of iron in the bad wheel, and that instead of soft ferrite we have the hard embrittling cementite.

TABLE II.

	Good Wheel.	Bad Wheel.
MnS	0.206 per cent.	0.195 per cent.
FeS	0.121 " "	0.315 " "
FeSi	2.045 " "	1.923 " "
Fe_3P	2.755 " "	3.335 " "
Pearlite	67.610 " "	84.492 " "
Ferrite	23.963 " "	0.000 " "
Cementite	0.000 " "	7.390 " "
Graphite	3.300 " "	2.350 " "
	100.000	100.000

[4]*Transaction* of the American Society for Testing Materials. Vol. II, 1902.

Value of Shrinkage Tests.

It is well known to all foundrymen that the metallurgy of cast iron is unusually baffling, becaues of the double and contradictory influence which so many of the impurities have, and to which I have referred above. To obtain in a given casting a certain amount of chill, or of combined carbon and graphitic carbon, or of shrinkage, etc., under varying conditions of impurities, size of casting, rate of cooling, etc., is most confusing. Casting a shrinkage test bar undoubtedly aids greatly in determining the relative effects of all the varying conditions. Professor Turner has devised a very simple apparatus for making a shrinkage test which will not only measure the ultimate shrinkage of the iron, but will also show the different expansions, such as given in Fig. 1.[5]

This test will show at a glance, not only the shrinkage of the iron but also give some indication of its liability to check, its strength, hardness, combined carbon, graphite and chilling properties, and is thus much more useful as a practical test than several laboratory tests.

NEW CONSTRUCTION IN PITTSBURG DISTRICT.

The Jones & Laughlin Steel Co., Pittsburg, has authorized the construction of four 500-ton blast furnaces and six Talbot open-hearth furnaces on the site of the property acquired by the company several months ago on the Ohio river near Alliquippa, 20 miles below Pittsburg on the Pittsburg & Lake Erie railroad. Details as to what finishing mills will be located at the new plant have not been decided but on account of the limited space at the present South Side plant, Pittsburg, any future extensions of large dimensions must of necessity be on the new down-river location.

The American Sheet & Tin Plate Co., has decided to install eight additional hot sheet mills at the Vandergrift plant, making a total of 37. This plant is the largest and most modern sheet mill in the world. Two new mills will be added to the Pennsylvania works and one to the Pittsburg works of the company.

[5]This apparatus is described in the *Journal of the Iron and Steel Institute*. No. I, 1906, pages 53-54.

CANADIAN NEWS NOTES.

(Special Correspondence.)

Toronto, Canada, Nov. 2.—The Ontario government has extended for five months the Sault Ste. Marie loan guarantee for $1,000,000, falling due Nov. 1.

The Canadian Improvement Co. had been negotiating with prominent financial firms to enable it to take up the guarantee, but owing to various delays was not prepared to meet the payment when due.

As a result of the civic investigation held some months since, prosecutions have been instituted against a number of parties tendering upon contracts, for conspiracy to defraud the city.

FIG. 11.—HIGH CARBON STEEL CONTAINING PEARLITE SURROUNDED BY CRYSTALS OF HARD, BRITTLE CEMENTITE (Fe_3C). CEMENTITE MAKES THIS STEEL DIFFICULT TO MACHINE. Magnification, 250 diameters.

On Oct. 30 the case against the contractors who tendered for metallic roofing for the St Lawrence hall came up for preliminary hearing before the police magistrate. The defendants were the Metallic Roofing Co., Albert B. Ormsby, Harvey Hutson, John T. Hutson, Asa Matthews, Thomas D. Alexander and E. Wheeler. The evidence showed that a meeting was held by the tenderers and an agreement made by which the Metallic Roofing Co. was to put in the lowest tender at $12,970, the figures in the other tenders being kept above this, in consideration of which each was to receive $275—others being also paid for not tendering. The defendants were committed for trial.

The buildings of the Dyment Foundry Co., Barrie, Ont., with the exception of the molding shop were destroyed by fire Oct. 28, causing a loss of $80,000. There was no insurance.

CONVERTER STEEL CASTINGS PRACTICE.—II.

By Arthur Simonson.

In attempting to give a detailed description of the operation of a Tropenas plant, it is realized that no amount of written or spoken matter will enable a person not thoroughly acquainted with steel making in general, to produce any kind of castings, to say nothing of the high-grade work that is called for today. The only way to learn how to operate a converter plant is to spend a long time in company with one who has had considerable experience and is perfectly familiar with the reactions that take place. It is true that when the converter was first introduced the pioneers had no one to instruct them, but it would be much too costly for all to learn by the same means. It is true, indeed, that after being under personal instruction and seeing a great many blows made, conditions may arise after the operator is left to himself which may get the better of him, and cause him to forget some of the principles that have been drilled into him. It is only by the strictest attention to details that success

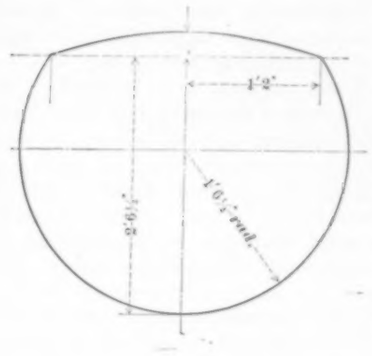


Fig. 1.—Forms for Lining a Converter.

is achieved, but this is true of all businesses, not only steel making. An unsuccessful foundry business resembles a Kansas cyclone in its certainty of disaster—quick and complete. A foundry that is not watched at every point can absorb money as fast as a Rockefeller can pour it in, as many a poor man has discovered. The essentials to success are shrewdness, watchfulness and science.

Lining of Converter.

There are two or three ways to line the converter, all equally good, the factors determining the use of any one being convenience and local conditions. It may be lined with special blocks, which while expensive, make the time occupied in repairs much less, this being often a very serious matter when the converter needs repairing and orders are waiting fulfillment. The chief drawback to the use of special blocks is that in making repairs a large amount of good brick has often to be cut away to make room for the new ones. A sand lining rammed in to shape may be used and is probably as good and cheap as any

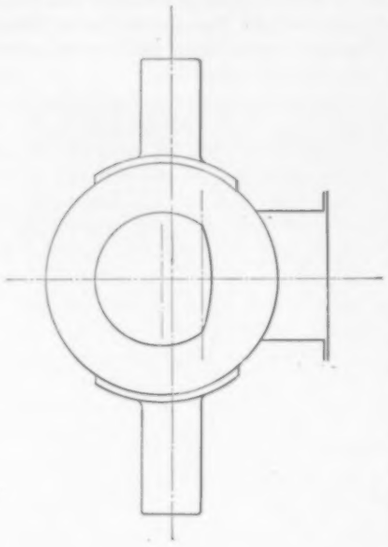


Fig. 2.—Locating a Form.

provided the proper grade of material is available. The third way is to use the ordinary shapes of furnace brick. This is probably the most common way and will be described in full detail as it probably calls for more explanation than the others. Whatever material is used it is necessary that it should be as refractory as possible, and nothing should be used in the way of brick that has been burnt at a lower temperature than is necessary to turn over a 3,500-degree Seger cone. This means about 95 per cent silica and almost perfect freedom from lime and magnesia. In the case of ganister mixture, the very best quality of silica clay must be used and in order to cause it to set very hard, it may be mixed with weak lime water instead of ordinary water.

Procedure for Lining the Converter with Ordinary Forms of Silica Brick.

The bricks used are the square 9 x 4½ x 2½-inch, with the arch 9 x 4½ x 2½ x 1½-inch, the wedge, 9 x 4½ x 2½ x 1½-inch, and a special wedge used in the mouth 9 x 4½ x 2½ x 1-inch. A small quantity of split brick is also needed, this is a rectangular brick one-half the thickness of the ordinary square.

Two or three rough wooden forms should be prepared having dimensions as shown in the sketch Fig. 1. They are made by sawing out boards for top and bottom, two inches less in dimensions each way, and then nailing one-inch strips on the edges. The forms are eighteen inches high. Set the converter in a vertical position by means of a plumb line, and then commence the lining operations by laying ordinary firebrick in the circular bottom until a level of about twenty-six inches below the center of the lower tuyere slot in bottom wind box is reached. Break all joints and set alternate courses at right angles. Use ordinary firebrick of good quality for this part of the operations, as they are less friable than the silica brick, and do not come into direct contact with the heat. The cement used may be made of one-half each high-grade silica clay and crushed silica rock. For grouting in the courses after laying this cement may be thinned down with water.

The next step is to set one of the forms. The illustration, Fig. 2, shows the location of this. It will be seen that the circular part of the form is concentric with the circular shell of the converter, and the part of larger radius which gives the conformation of the face of the tuyeres is set so that a line joining the ends of the arc is parallel to the center line of the trunnions. A course of arch brick on end is laid round the form, and outside of this a row of ordinary firebrick backing and the remaining space between brick and shell is rammed in with ganister. This

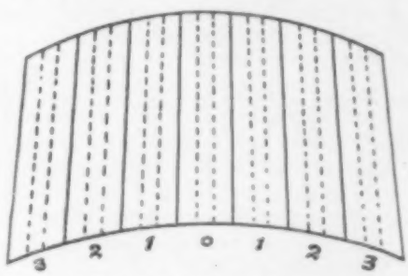


Fig. 3.—Tuyere Block.

procedure is continued until a level two and a half inches below the center of the slot in the shell referred to above is reached. This brings us to the most important point in the lining, namely the setting of the tuyeres. Upon this depends a great deal of the assurance of success in the subsequent manufacture of the steel. The tuyeres both individually and as a whole, must be set absolutely level both in a direction parallel to their length and also in a direction at right angles to this. In other words, the tuyeres must all be in exactly the same plane. The illustration shows the tuyeres grouped together and it will be noticed that for convenience they are numbered No. 0 in the center, No. 1 for the first tuyere on each side, then No. 2 and No. 3 respectively, outside this. The higher numbers diverge more from the center than the lower numbers, and

the whole system is symmetrical. These tuyeres are made of the very highest grade of silica material available, and burnt at a very high temperature as they are subjected to the greatest amount of wear and tear and the greatest amount of chemical action. In setting the tuyeres it must be borne in mind that it is the holes that must be leveled up and not the outside of the bricks, as the outside may be warped to some extent. Round iron bars of smaller diameter than the tuyeres should be inserted in the holes and the leveling done on the protruding ends of these, this being the only way that accuracy can be insured. Together with this leveling it should be ascertained that the tuyeres come opposite the slot in the shell communicating with the lower wind box, to allow of an unrestricted passage of the air into the converter and the possibility of cleaning out any slag or iron that may inadvertently get into the tuyeres. After being satisfied that the lower tuyeres are correctly set in every particular, the upper tuyeres are set directly on top of them. The upper wind box has a slot corresponding with the lower one, and the rectangular openings in these tuyeres should be in line with it. It is not necessary to use the same care in setting these tuyeres, as they are merely combustion tuyeres and do not at any time approach the surface of the iron. They are numbered similarly and have the same conformation as the lower tuyeres. The body of the converter is then lined up to a point about two feet below the top of the cylindrical part of the shell, at which point the wooden forms may be dispensed with. Be sure to leave no open spaces between the bricks and grout all the joints well with thin grout. From this point a certain amount of mechanical skill is needed in setting the brick as it is largely a matter of hand and eye. It is not an easy matter to describe, nor is it an easy matter to accomplish, but the principle is to overlap each course from this point up the cone until the lining terminates at the mouth of the converter in a circular opening fifteen inches in diameter. The last two rows in the mouth may be made with the special wedge brick mentioned. After the lining is completed the wooden forms may be burnt out. The bottom is then built up with pure silica brick until a depth of from sixteen to seventeen inches below the bottom edge of the tuyeres is reached. This corresponds very closely to a capacity of two tons. The lining being now complete, a wood fire is started, the blast valve being shut off and all covers off the wind boxes. If the blast valve from the blower is left open, it may happen that gas will accumulate in the pipe and cause an explosion which may be more or less serious. In describing the lining of the converter nothing has been said of the manhole door in front of the converter, which some operators use all the time and and others have discarded. It is most useful in making repairs, enabling the converter to be cooled off very rapidly and also forms a convenient way of handing in to the bricklayer his supplies of bricks and cement. When this is used an arch should be built around the opening in the shell and filled in afterwards, then when the manhole is punched out the remainder of the lining is undisturbed.

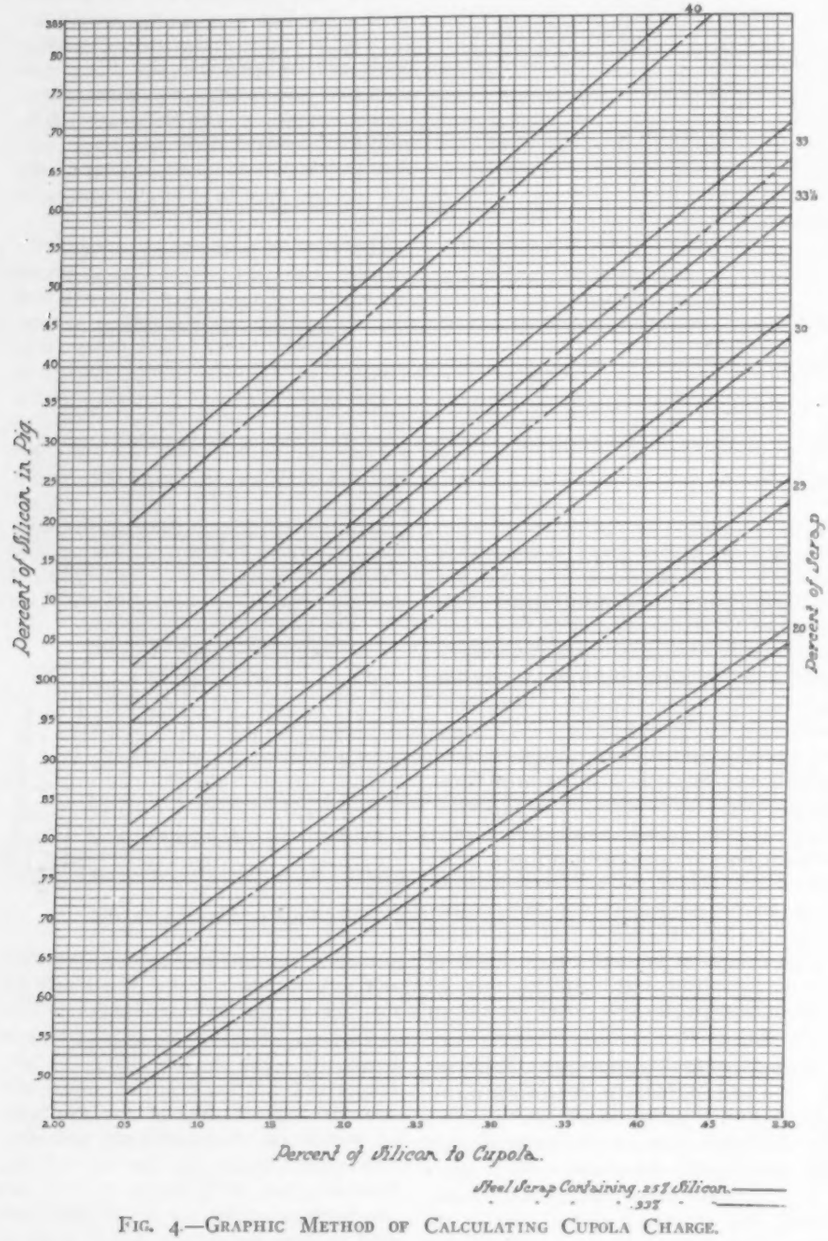


FIG. 4.—GRAPHIC METHOD OF CALCULATING CUPOLA CHARGE.

Life of Lining.

It is impossible to give figures relating to the life of furnace linings. So much depends on shop practice and quality of materials that it is impossible to make an accurate estimate. For instance, if a furnace is run every other day and repaired every other day, it will last longer than if run daily for the same number of blows. There is a limit to the amount of patching that can be done, and if it is done before too late it will not be necessary to cut away a lot of good brick in order to make extensive repairs. The inner row of brick, that is the silica part of the lining, should never be allowed to be entirely penetrated. By making repairs at as short intervals as possible and preserving the original lines of the furnace, the life of linings will be preserved indefinitely, and the blows will be much

more regular and uniform. The parts that are most subject to corrosion are the regions immediately surrounding the tuyeres, and at the base of the upper cone where the metal lies when the converter is in the pouring position. When repairing the tuyeres, bars slightly less in diameter than the holes should be inserted and ganister rammed around them and allowed to dry with the bars in situ. By careful attention to repairs as many as 150 and even 200 blows can be gotten out of the converter before it is necessary to renew the tuyeres, and up to one thousand blows before it is necessary to entirely reline. A new set of tuyeres can be inserted in about three hours. A considerable amount of the depreciation of the lining is caused by crushing and spalling. Silica brick has a very high coefficient of expansion and the alternate heating and cooling of the lining causes it to crush at one time and spall off at another. The expansion is so great that the bolts holding down the upper cone sometimes pull apart, the heads flying several yards. After a converter has been newly lined these bolts should be loosened to allow the expansion to take place.

Melting Stock.

The metal that is put into the converter to be converted into steel must be of a definite composition within certain limits. Before going into the converter it has to be melted in a cupola, where certain losses take place. These losses have to be taken into consideration when figuring the charges. In specifications for steel castings a limit is generally set for the content of sulphur and phosphorus, and as in no acid furnace can this percentage be reduced it is necessary to provide raw material sufficiently low in these elements to meet the specifications. In this respect it is exactly the same as the open-hearth practice. The analysis of the metal before blowing must be:

Silicon	1.80 - 2.10 per cent.
Manganese	0.60 - 1.00 per cent.
Sulphur, Phosphorus	low as possible.
Carbon	about 3 per cent.

The cupola charges are made up of pig iron and steel scrap. The steel scrap is generally the heads and runners, scrap and defective castings from previous heats. Outside scrap is so uncertain in its composition that it is unsafe to use it. As a rule the best way is to arrange to melt in the cupola just the amount of scrap made in average daily practice. If a surplus accumulates the percentage can be temporarily increased, and if a deficit occurs the amount can be cut down. Ordinarily with a satisfactory operation of the plant, about twenty to twenty-five per cent of steel scrap can in this way be carried in the cupola charges. The flux used in the cupola consists of limestone or oyster shells, and the coke is seventy-two-hour coke with sulphur 0.75 per cent or thereabouts.

Calculation of Cupola Charge.

There are two ways in which this may There are two ways in which this may be done, a graphic way and an arithmetical way. In figuring out the charge the two elements which are closely controlled are the silicon and manganese, and particularly the silicon. This element is always figured first. As regards sulphur and phosphorus it is understood that they are as low as possible in the raw materials so that after that point has been settled, they may be neglected. Carbon, that is, total carbon, is practically the same in all grades of pig iron used and may be neglected on that account, as it will be practically uniform anyway. The relation of the combined carbon to the graphitic does not make any difference, as after the first few minutes' blowing it will all be combined.

The first thing to be decided is the amount of scrap it is proposed to carry in the charge. Of course there are cases where the grade of pig iron available will place a limit on the amount of scrap that may be used. If the pig iron is all high silicon, it will be imperative to use a high percentage of scrap to cut down the silicon to the required amount. If the pig iron is low in silicon, it may be possible to use only a very small proportion of scrap. But for the purposes of this article we will suppose that the conditions are ideal, that we have the correct kinds of pig iron and are able to carry any reasonable amount of scrap. As stated above, it is wise, all things being equal, to confine oneself to the scrap made in one's own plant, and in an ordinary way this will amount to say, from twenty to twenty-five per cent. Let us assume that we have two brands of iron analyzing:

	No. 1.	No. 2.
Silicon	3.50	2.00
Manganese	0.25	1.50

Let us assume that our steel scrap averages silicon 0.25 per cent, manganese 0.75 per cent. Let us also assume that we will carry twenty-five per cent of scrap.

Problem.—In a 100-pound charge, what quantities of the above No. 1 and No. 2 pig irons and steel scrap will give a mixture with an analysis of say, silicon 2.00 per cent, and manganese 0.80 per cent? We know how much steel scrap we are going to carry and will figure the silicon first.

(Weight of scrap × per cent silicon) + (weight of pig iron × per cent silicon) = (1,000 pounds mixture × 2.00 per cent silicon)

$$(250 \times 0.25) + (750 \times X) = 2000$$
$$62.5 + 750X = 2000$$
$$750X = 2000$$
$$X = 2.5833$$

The next question is: In a charge of 750 pounds, how much pig iron No. 1 at 3.50 per cent silicon, and how much pig iron No. 2 at 2.00 per cent silicon, will give a mixture containing 2.5833 per cent silicon?

Let X equal the weight of pig iron No. 1 containing 3.50 silicon, then (750 — X) represents the weight of pig iron No. 2 containing 2.00 silicon, and $(X \times 3.50) + (750 - X)\ 2.00 = (750 \times 2.5833)$

$$3.50\ X + 1500 - 2X = 1937.5$$
$$X = 291.6$$

The quantity of No. 1 pig iron required is therefore accurately 291.6 pounds, and of No. 2 is 458.4 pounds.

In round figures the amounts of our cupola charge of 1,000 pounds would therefore be:

No. 1 pig iron	290 pounds.
No. 2 pig iron	460 pounds.
Steel scrap	250 pounds.

Let us check this over to see if it is correct:

$(290 \times 3.5) + (460 \times 2.00) + (250 \times 0.25) = (1000 \times 2.00)$

$1015 + 920 + 62.5 = 1997.5$

This figures out as closely as it is possible to weigh pig iron. The above calculations cover the silicon only, and while they seem bulky they have been put down in detail to make it perfectly plain. As a matter of fact the calculations are made in a very few minutes. We must now see these weights will result in content of manganese.

(290 pounds No. 1 × 0.25 manganese) + (460 pounds No. 2 × 1.50 mang.) + (250 pounds steel scrap × 0.75 manganese) = (1000 pounds total charge × X per cent manganese), that is:

$$72.5 + 690 + 187.5 = 1000\ X$$
$$X = 0.95 \text{ per cent.}$$

Allowing for the loss of manganese that takes place in melting in a cupola this 0.95 per cent will probably be a shade under 0.80 when melted. The above mixture is therefore satisfactory and will give correct results. There will be a slight loss of silicon in the cupola, but the result will be well within the working limits. The above calculations can be worked out for any grades of pig iron by substituting percentages.

The Graphic Method.

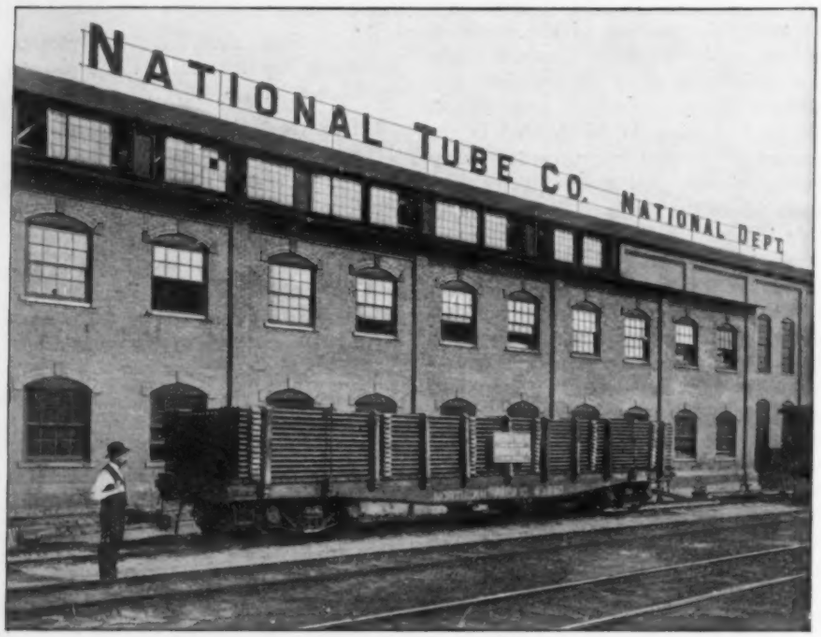
This method has been figured out on the above lines and reduced to a diagram. For the diagram reproduced here the writer is indebted to A. H. Jameson. It is figured for two grades of steel scrap, one containing 0.25 per cent of silicon and represented by the full line, and one containing 0.33 per cent of silicon and represented by the broken line.

The diagram may be used in a variety of ways. For instance, it may be

used to give the amount of steel scrap that a certain pig iron will carry to give a desired per cent of silicon in the cupola. Knowing the per cent of silicon desired in the cupola, and the amount of scrap that is available, it will give the per cent of silicon the pig iron must contain. Given the per cent of silicon in the pig iron and the amount of scrap to be carried it will give the resulting silicon in the cupola.

SHIPPING FORTY-FOOT PIPE FROM McKEESPORT.

The first shipment of pipe in 40-foot lengths from the McKeesport plant of the National Tube Co., made



500 Forty-foot Lengths of Pipe Ready for Shipment.

Oct. 6, is shown in the accompanying illustration. While pipe in these lengths has been made at McKeesport for some time, it has never been shipped, on account of the difficulties in handling and shipping it, until a month ago. The car shown in the illustration contains 20,000 feet of two-inch black pipe in 500 forty-foot lengths and was consigned to Los Angeles, Cal. The company is now prepared to ship these lengths in sizes from one to three inches, standard or extra strong. On account of there being no pots large enough these extra lengths cannot be galvanized.

The uses to which 40-foot pipe is put are in refrigerator and cold storage plants, cooling purposes, fences, and it is particularly adapted to pneumatic and hydraulic signaling purposes.

SOME MANUFACTURING FIGURES.

The bureau of census estimates that during 1905 the value of manufactures in the United States totaled $14,802,147,087. In 1900 the value of products was $11,411,121,122, the increase in the five years' interval being almost 30 per cent. In that time the total wages paid employes have increased at the rate of $120,000,000 a year and it is significant that the percentage gain in the wage item is practically identical with the percentage gain in value of manufactures. The manufacturing capital in 1905 totaled $12,686,265,673, of which 82.8 per cent was owned by incorporated companies, turning out 73.7 per cent of the total products, 9.4 per cent by firms turning out 14.4 per cent of the product, 7.6 per cent by individuals turning out 11.5 per cent of the product, and 0.2 per cent was owned in miscellaneous ways. Of the 216,262 manufacturing establishments in the country 52.7 per cent were owned by individuals, 22.2 per cent were operated as firms and 23.6 per cent as incorporated companies. The average investment of incorporated establishments, however, was, in round numbers, $206,000 per company, while that of individual owners was only about $9,000.

Two workmen were injured and considerable damage was done by an explosion of molten metal in one of the blast furnaces of the Central Iron & Steel Works, Harrisburg, Pa., Nov. 1.

HULETT ORE UNLOADERS AT BUFFALO.

The accompanying illustrations show the latest installation of Hulett ore unloading machines. These are located on the docks of the Pennsylvania railroad in Buffalo, N. Y., and are electrically operated. As in the case of the other unloaders of this type previously installed, the machine handles a grab bucket with an average capacity for ten gross tons of iron ore. The spread of the bucket when open is over 18 feet, but by telescopic motion, it can be extended to a still greater distance, enabling it to cover a large amount of space in the hold of a steamer. It will reach more than half way from the center of one hatch to the center of the next one, when these are spaced 24 feet centers.

The bucket is carried on the end of a vertical dependent leg suspended from a walking beam, which raises and lowers it, as desired. The bucket leg is mounted on trunnions at the top, so that the bucket may rotate while operating in the hold of the boat. By this means, it is allowed to reach out in any direction. The walking beam is mounted on a trolley or carriage, which carries it over the hold of the boat and back again over the dock.

Motive power for operating the unloader is furnished by motors receiving current through sliding contacts. The bucket-opening-and-closing motor is 85 horsepower. That for hoisting the walking beam is 150 horsepower and for traveling in and out 50 horsepower; for operating the bucket and moving the machine, a 75-horsepower motor is used.

Ore may be unloaded into railroad cars on tracks underneath the unloader, or may be carried back on the cantilever of the unloader and delivered into a storage pit at the rear of the dock. In either case, it is delivered from the bucket into a special "bucket car," or traveling hopper, provided with folding chutes for discharging the material into cars or into the storage pit. This bucket car travels back and forth, as required, and on reaching the desired dumping point, is automatically discharged. The entire installation was made by the Wellman-Seaver-Morgan Co., Cleveland, which is the sole builder of the machine.

The output of the Dominion Iron & Steel Co., of Sydney, N. S., for October in the various departments was as follows: Coke, 34,000 tons; pig iron, 23,325 tons; steel ingots, 25,425 tons; blooms, 22,553 tons; steel rails, 12,621 tons; rods, 5,214 tons. Three blast furnaces were operated during the month and the blooming and rail mill worked double shift.

FIG. 1.—HULETT ORE UNLOADER AT BUFFALO. BUCKET IN HOLD OF VESSEL.

FIG. 2.—HULETT ORE UNLOADER AT BUFFALO. BUCKET ELEVATED.

Dull Sagging Market Follows Election.

A dull and sagging market followed the interruption of the election holiday, and trading through the remainder of last week was light, with fluctuations, generally downward, of small proportions. The removal of the campaign excitement from the situation and the certainty of no important changes in governmental policy, as the result of the election, cleared away the features which for a brief time had tended to cloud the all-important factor of a continued money stringency. Demands upon the banks were heavy during the week, and while loans decreased, the loss of reserve was still greater and the New York Clearing House on Saturday reported a considerable deficit in the legal reserve. Secretary Shaw has announced that the gold available in the treasury is not to be used to relieve the situation, except in case of extreme suffering, and as there is little hope for further importations from abroad, there is no other prospect than that the heavy requirements of the fall must be met with such gold as is already in use. Effects of the long continued spurt of prosperity are becoming more evident, notably during the past week in the granting of increased wages to several hundred thousand employes. All of this tends to increase the operative and productive cost and to establish commodities on a higher level of prices. In the iron and steel field there is nothing to indicate decreased activity in the near future. October's output all over the country was extremely heavy and the scarcity of raw materials, labor and transportation facilities is the only treatening feature. The Steel Corporation stocks were lightly dealt in during the week and shared in the general decline. Other securities of the industry were comparatively inactive.

A special meeting of stockholders of the Niles-Bement-Pond Co., has been called for Nov. 20 for the purpose of voting upon an amendment to the charter, authorizing an increase in common stock from $5,000,000 to $8,500,000. The quarterly dividend of 1½ per cent on preferred stock is payable Nov. 15.

The Inland Steel Co., which has under way extensions which will practically double its plant, has given a mortgage for $2,500,000 as security for 2,500 $1,000 gold bonds to mature in 1926, with five per cent interest.

The Pratt & Whitney Co. pays a 1½ per cent, quarterly dividend, on preferred stock Nov. 15. The American Radiator Co., on the same day, pays a quarterly preferred dividend of 1¾ per cent. A one per cent common stock dividend is payable Dec. 31.

Stockholders of the Montreal Steel Co. have approved a proposition to increase its capitalization from $1,500,000 to $2,000,000. The additional stock to be divided equally between common and preferred.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation Nov. 3.	Closing Quo. Nov. 10.	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers Co	16⅝	16⅞	+ ¼	Sept.	100	19,820,000	.....	.....	.....
Allis-Chalmers preferred	45⅜	44	−1⅜		100	16,150,000	7 cum	.....	Feb., 1904
American Can	6¼	6	− ¼	Apr. 24	100	41,233,300	.....	.....	.....
American Can preferred	54	54	.....		100	41,233,300	7 cum	5 Q.	Oct., 1906
American Car and Foundry	44⅜	43¼	−1⅛	June 28	100	30,000,000	.....	.....	May, 1905
AmericanCar and Foundry preferred	101½	101	− ½		100	30,000,000	7 n. c.	7 Q.	Oct., 1906
American Locomotive	.....	72¾	− ⅛	Oct. 16	100	25,000,000	.....	1¾	Nov., 1906
American Locomotive preferred	111	110¾	− ¼		100	24,100,000	7 cum	7 Q.	Oct., 1906
American Shipbuilding	76	77	+1	Oct. 2	100	7,600,000	4 n. c.	1 Q.	Aug. 1906
American Shipbuilding preferred	109	109	.....		100	7,900,000	7 n. c.	1¾ Q.	Aug. 1906
American Steel Foundries	10⅝	10	− ⅝	Oct. 3	100	17,700,000	.....	.....	.....
American Steel Foundries preferred	44¼	44½	+ ¼		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	72	72	.....	June 5	100	1,000,000	4	4	Sept., 1906
Barney & Smith preferred	140	140	.....		100	2,500,000	8 cum	8 Q.	Sept., 1906
Bethlehem Steel	18	18⅝	+ ⅜	April 3	100	15,000,000	.....	.....	.....
Bethlehem Steel preferred	67¼	67¾	.....		100	15,000,000	7 n. c.	7 Q.	Aug., 1906
Bullock Electric preferred	112	112	.....	Oct. 2	100	1,000,000	6	6 Q.	July, 1906
Cambria Steel	37¼	37¼	.....	March 20	50	45,000,000	6	3 Q.	Aug., 1906
Cambria Iron	48	48	.....		50	8,468,000	4	4 S. A.	Oct., 1906
Colorado Fuel & Iron	52¼	51⅛	−1	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	16	17	+1	May 31	100	6,086,000	5	.....	Nov., 1902
Crucible Steel	13⅛	13	− ⅛	Oct. 17	100	25,000,000	.....	.....	.....
Crucible Steel preferred	79¾	80	+ ¼		100	25,000,000	7 cum	.....	Sept., 1906
Empire Steel	8	5	−3	Feb. 28	100	2,281,400	.....	.....	.....
Empire Steel preferred	48	41	−7		100	2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	6	6 Q.	Aug., 1906
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	Aug., 1906
General Electric	175	173	−2	May 8	100	48,256,050	8	8 Q.	Oct., 1906
International Pump	45	44⅛	− ½	June 5	100	12,362,500	.....	2	July, 1905
International Pump preferred	81	81⅝	+ ⅝		100	8,850,000	6 cum	6 Q.	Nov., 1906
Lackawanna Steel	72	71	−1	March 14	100	34,971,400	.....	.....	.....
Lake Superior Corporation	16½	16⅜	.....	Oct. 3	100	40,000,000	.....	.....	.....
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	Sept, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	Aug., 1906
Otis Elevator Co	50	50	.....	March 19	100	6,350,300	.....	2 A.	Apr., 1906
Otis Elevator Co. preferred	97	97	.....		100	5,589,500	6 n. c.	6 Q.	Oct., 1906
Pittsburg Coal Co	16⅜	16	− ⅜	Feb. 12	100	30,135,000	.....	.....	.....
Pittsburg Coal preferred	59½	58	−1½		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	54⅜	52⅛	−2⅛	Feb. 21	100	12,500,000	.....	3	Aug., 1904
Pressed Steel Car preferred	99	100	+1		100	12,500,000	7 n. c.	7 Q.	Nov., 1906
Pullman Palace Car	259½	260	+ ½	Oct. 18	100	74,000,000	.....	8 Q.	Oct., 1906
Railway Steel Spring	51¼	52¼	+1	March 1	100	13,500,000	.....	4 S. A.	Oct., 1905
Railway Steel Spring preferred	100	100	.....		100	13,500,000	7 cum	7 Q.	Sept., 1906
Republic Iron & Steel	35¾	35¼	− ½	Oct. 17	100	27,352,000	.....	.....	.....
Republic Iron & Steel preferred	97⅜	97⅛	− ¼		100	20,852,000	7 cum	7 Q.	Oct., 1906
Sloss-Sheffield	73	73	.....	March 14	100	7,500,000	5	5	Oct., 1906
Sloss-Sheffield preferred	106	106	.....		100	6,700,000	7 n. c.	7 Q.	Oct , 1906
Tennessee Coal & Iron	160	161	+1	May 15	100	22,552,800	.....	4 Q.	Nov., 1906
U. S. Cast Iron Pipe & Foundry	47⅜	46½	−1	June 27	100	12,500,000	.....	2	Dec., 1906
U. S. Cast Iron Pipe & Foundry preferred	91	89¾	−1¼		100	12,500,000	7 n. c.	7	Dec., 1906
U. S. Steel	47⅞	46⅜	−1⅝	April 16	100	508,302,500	2 n. c.	½ Q.	Oct., 1906
U. S. Steel preferred	.....	104⅞	− ⅜		100	360,281,100	7 cum	7 Q.	Nov., 1906
U. S. Steel 5's	98⅜	97⅝	− ¾		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	55	54⅞	− ⅛	Sept. 18	100	8,641,600	.....	.....	.....
Westinghouse Electric	154½	157⅝	+3	June 27	50	20,996,350	10	10 Q.	Oct. 1906
Westinghouse Air Brake	158½	158	− ½	Oct. 2	50	10,990,450	30	30 Q.	Oct., 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Etna Coal & Iron Co., Ironton, O., which is to erect a blast furnace in that district, has been incorporated for $300,000 by E. J. Bird, Levi D. York, George W. Keyl, George M. Gray and David Holley.

Application has been made for a charter for the England-Granger-Boyer Co., Reading, Pa., by Harry C. England, John W. Granger and Harrison D. Boyer. The new company will manufacture and sell wire and metal goods.

The Rogers Mfg. Co., Ltd., Toronto, Ont., has been incorporated with a capital of $200,000 to engage in foundry and machine work. The provisional directors are: Albert F. Reitz and Albert J. Stanford, of Kansas City, Kan., and Loftus E. Dancey.

The Sherman Cooper Co., Ltd., Toronto, Ont., has been organized with a capitalization of $40,000. The provisional directors are: Walter S. Cooper, Herbert B. Odell and Amos M. Witmer. It will manufacture machinery and electrical apparatus.

The Ladewig & Stock Co., Waukesha, Wis., has been organized with a capitalization of $25,000 by William E. Ladewig, Harry E. Stock and Charles W. Newbury.

The Buffalo Blower Co., Buffalo, has been organized with a capitalization of $10,000 by William F. Wendt, Henry W. Wendt and Wilbut F. S. Lake.

The Tolhurst Machine Works, Troy, N. Y., organized with a capital stock of $50,000, will manufacture engines, boilers, machinery, tools, etc. The incorporators are: William H. Tolhurst, Pittsfield, Mass.; Clark H. Foster and A. G. Goldthwait, Troy.

The Lorain Casting Co., Lorain, O., has been incorporated with a capital of $60,000 by R. Thew and others.

The Tuohy Bros. Co. has been incorporated with a capital stock of $10,000 to manufacture machinery, etc. The incorporators are: John J. Tuohy and James A. Tuohy, No. 52 Willow street, Brooklyn; and Frank L. Howard, Elizabeth, N. J.

The Roell Mfg. Co., Independence, Mo., has been organized with a capitalization of $10,000 by C. F. A. Roell, W. W. Budworth and A. R. White.

The Reliance Machinery & Supply Co., Chicago, has been incorporated with a capital of $25,000 by C. H. Hartmann, Clair E. Moore and Almon W. Bulkley.

The Judge Manufacturing Co., has been incorporated with a capital stock of $10,000 to manufacture tools, machinery, etc. The incorporators are: John R. Judge and Mary H. Judge, No. 205 Cester street; and Gordon T. Hackett, No. 536 Ellicott Square, all of Buffalo, N. Y.

The Insley Iron Works, Indianapolis, Ind., has increased its capital stock from $15,000 to $25,000.

The New Rochelle Iron Works has been incorporated with a capital stock of $5,000 to manufacture iron. The incorporators are: Louis Diamond, No. 43 Eldridge street, Rebecca Shapiro, No. 190 Stanton street, and William Nissenson, No. 257 Broadway, all of New York.

The Salem Foundry & Machine Co., Salem, Va., has been incorporated by J. E. Shank and W. S. Shank, of Salem, Va., and H. D. Shank, of Cedar Bluff.

The International Saw & Tool Co., Columbus, O., has been incorporated with a capital of $50,000 by Andrew Krieger, James S. Glenn, D. D. Davidson, John Cummins, Austin V. King and W. L. Merwine. The new company will erect a plant in that city for the manufacture of all kinds of saws, making a specialty of a flexible slot inserted toothed circular saw.

The Cold Pressed Steel Co. has been incorporated by New Haven, Conn., interests and will begin the manufacture of steel furniture for offices in the building formerly occupied by the W. S. Burns Mfg. Co.

New Construction:—

The Pittsburg Valve & Fittings Co. Pittsburg, has practically completed a steel and brick foundry building 160 x 360 feet for malleable castings, equipped with two 35-ton air furnaces and 70 air-driven molding machines. Sufficient screw cutting capacity has already been provided. Proper trackage for hauling material and fuel will surround the building, the intention being to carry all raw material under cover. It is expected to blow in the furnaces between the 1st and 15th of December. This completes the company's series of foundries and gives it the following capacities: gray iron, 40 tons daily; brass, four tons daily; malleable iron, 25 tons daily.

The Standard Foundry & Mfg. Co., De Kalb, Ill., has practically completed its plant at that place for the production of gray iron castings and machine specialties. The main building is 66 x 200 feet, with an L 40 feet square. The store house is 50 x 100 feet, and a number of other buildings are under construction, it being the intention to begin operations January 1, with a monthly capacity of 250 tons. S. M. Hunt and A. N. Wheeler are the promotors.

The Pennsylvania Iron Works Co., Philadelphia, has purchased a tract of 15 acres in Eddystone, Pa., where a large plant for the manufacture of marine gas engines will be erected. The main shop will be 65 x 735 feet.

The Soo line has completed plans for an extensive boiler plant at Shoreham, on the outskirts of Minneapolis. The main building will be 119 x 202 feet, and the total expense involved will be in the neighborhood of $100,000.

James Ackroyd & Sons, Albany, N. Y., manufacturing architectural sheet metal work and skylights, have purchased a tract of ground on which to erect a main shop building, 60 x 100 feet, with a 25 x 40 foot addition.

The Burke Machinery Co., Cleveland, manufacturing a full line of sensitive bench drills, milling machines, coal oil forges and tapping machines, has just moved into its new plant at Perkins avenue, N. E. The capacity of these works, which is double that of the former plant, is already taxed to such an extent that further extensions are contemplated.

The Sharon Steel Hoop Co., Sharon, Pa., expects to complete its new blooming mill building, 80 x 330 feet, before the close of the year. This will replace a wooden structure. The recent extensions to its open-hearth building were made to afford sufficient room for handling production, as was also the crane runway installed some time ago.

The Hartley-Rose Belting Co., Pittsburg, has in process of construction a warehouse which will increase its capacity about 50 per cent.

The United Steel Co., Canton, O., is now operating a new 50-ton basic open-hearth furnace. This, in connection with a new four-hole soaking pit, a new machine, blacksmith shop and other additions to buildings and equipment, increases its capacity about one-half.

The Baird Machine Co., Oakville, Conn., has an addition to its plant under way.

The Hill Foundry & Machine Co. is completing two large additions to its plant, the capacity of which will be thereby doubled.

Plans have been prepared for a large addition to the foundry of Love Bros., Inc., Aurora, Ill.

The Reading Radiator Co., Reading, Pa., is to erect an addition to its foundry, 60 x 90 feet.

The Portsmouth Steel Co., Portsmouth, O., is now operating an additional open-hearth furnace, the installation of which necessitated the extension of its open-hearth building. The plant now consists of five 40-ton furnaces, four basic and one acid.

I. Levinstein & Co., Davenport, Ia., state that new construction work has been postponed until March of next year. At that time they will erect a new building 100 x 200 feet, and will extend their pattern shop and core-making room with the idea of manufacturing gray iron castings and pipe.

The International Harvester Co. expects to have its new mill at Deering ready for operation about Feb. 1 or March 1, next. This will increase its finishing capacity by about 75,000 tons annually, but will not increase its output of raw material in any way.

The Valley Construction Co., Milwaukee, manufacturing castings and chain belts, has let contracts for a foundry building, 70 x 160 feet, a carpenter shop, cleaning house, power house, office and pattern shop.

The Morris & Bailey Steel Co., Pittsburg, is erecting a new boiler house of brick and steel construction, 65 x 100 feet, which it hopes to occupy within a few days. It recently completed the erection of two large furnaces for annealing cold rolled strips, giving an additional annealing capacity of 5,000 tons per year.

The Stewart Iron Works Co., Covington, Ky., manufacturing iron fences, is enlarging its plant by the erection of a new factory building, 100 x 160 feet.

The Ralston Steel Car Co., Columbus, O., is preparing plans for a new malleable castings plant in connection with its shops. It expects to have an output of twenty-five cars a day by the first of the year, when the present malleable plant will prove inadequate. The company has purchased a number of lots near its works with the idea of housing its employes.

An iron foundry is to be erected at Wrightsville, Pa., by H. K. Smith and C. W. Schultz, formerly connected with the Susquehanna Casting Co., and H. B. Kerr, A brick structure 50 x 100 feet will be erected.

The Atha Steel Casting Co., Newark, N. J., has recently completed three 30-ton open-hearth furnaces and other large additions to its foundry, which have been under way for some time. The old foundry has practically been replaced by a modern plant of steel and concrete construction, and the company can now produce over 3,000 tons of open-hearth steel castings per month, with further extensions possible whenever needed. The company will also continue to use small converters for the production of small castings. It has always made a specialty of electrical steel, furnishing motor frames, caps, poles and armatures for many of the large electrical companies, and has also turned out a large tonnage of cast steel body and truck bolsters for railroad work. It has recently developed a new motor gear for street railway use, which is made of a steel so hard that it cannot be machined with ordinary tool steel, but is ground to dimensions. Even at this, however, the steel is so tough that test pieces can be bent cold through an angle of 180 degrees without showing fracture.

The Union Iron Works Co., Iola, Kan., has let contracts for the erection of a boiler shop, 90 x 150 feet.

The Susquehanna Hardware Mfg. Co., Buffalo, is building a structure 50 x 360 feet. W. L. Reid, of Buffalo, is purchasing power plant equipment which will consist of a 125-horsepower boiler and 100-horsepower engines, together with pumps, feed water heater and other power equipment.

The National Foundry Co., Erie, Pa., is building a steel casting plant of special design. F. Felkel is consulting engineer.

Work on an extension for the Union Iron Works Co., Erie, has been begun by F. Felkel, consulting engineer. The building is two spans, 51 feet, with two crane runways.

The Contractors' Castings & Machine Co., Buffalo, recently incorporated, has purchased a factory site on Hertel avenue upon which it will erect a foundry and machine shop to cost about $25,000.

Negotiations for a site for a new plant are under way by the Empire Foundry Co., Syracuse, N. Y. The company has plans prepared for a building 80 feet long, on which, it is expected, work will be started this fall.

General Industrial Notes:—

The western manager of the Marion Steam Shovel Co., George W. Barnhardt, has removed his office to 712 Monadnock building, San Francisco.

Walter Vosbury, heretofore one of the partners of the Deposit Foundry Co., Deposit, N. Y., has purchased the interest of the heirs of the late George M. Ballard, and is now sole owner.

Naylor Sons & Co., Sacramento, Cal., manufacturing engines and hydraulic machinery, have taken possession of their new shops on Fifteenth street, between R and S. The change was made in order to care for increased business.

A. A. Koch, manager of the Vulcan Iron Works, Mason City, Ia., has disposed of his interests to Ira Knapp, who thereby becomes sole owner.

The Marion Foundry & Machine Co., Marion, O., which recently purchased the plant of the defunct Edison Foundry & Machine Co., has organized by electing Louis Watzel president and general manager, Charles Reiger, vice president and Harry Noll, secretary and treasurer.

George Rudge Jr., of the Enterprise Boiler Co., Youngstown, O., brands as baseless the recent reports that he is about to dispose of his interests to outside capitalists. The concern was burned out some months ago, and is now using the plant of the Girard Boiler Co. for shop purposes.

The Wheeling Mold & Foundry Co. announces that its Pittsburg address is 823 Farmers Bank building.

The Cleveland Automatic Machine Co., Cleveland, has purchased a tract of land adjacent to its works at a cost of $25,000. It is stated that extensive improvements will be made.

The Monarch Iron Works, Plymouth, Ind., recently incorporated, has been occupying its new plant since Sept. 1, and previous to that was manufacturing in rented shops. The foundry is 72 x 140 feet, with a No. 3 Whiting cupola and charging floor equipped with incline and elevator. Core ovens are 15 x 20 feet and 4 x 10 feet. A machine shop, office building and pattern shop are in course of erection. Foundry work is being done under contract. E. S. Tascher, the manager, was formerly with the Dodge Mfg. Co., Mishawaka, Ind., the Webster Mfg. Co., Chicago, and more recently was superintendent of the foundry of the H. W. Caldwell & Sons Co., Chicago.

Schumacher & Boye, Cincinnati, announce foreign agents as follows: Ludwig Loewe & Co., 17-20 Huttenstrasse, Berlin, Germany; Ph. Bonvillain and E. Ronceray, 9 and 11 Rue de Envierges, Paris; Buck & Hickman, Ltd., 2 and 4 Whitechapel Road, London, and Takata & Co., Japan.

Fires and Accidents:—

The Kast Copper & Sheet Iron Co., Buffalo, was damaged to the extent of about $4,000 by fire Nov. 1.

A portion of the boiler shop connected with the blooming mill of the Franklin works of the Cambria Steel Co. burned Nov. 3, entailing considerable loss.

An 80-ton flywheel at the Whitaker Iron Works burst Nov. 6, tearing a large section from the roof and otherwise damaging the plant. No one was injured.

The Wisconsin Bridge & Iron Co., Winona, Mich., sustained a heavy loss recently through the destruction of its office building by fire.

The Dyment Foundry, Barrie, Ont., burned Oct. 28 with a loss placed at $80,000.